

COMMERCIAL CAR JOURNAL

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JUNE, 1937

THE



COMMERCIAL CAR JOURNAL

Vol. LIII.

No. 4

JUNE, 1937

Overload

Current Matter

THE generator article somewhere in this issue is the first of a series that will discuss electrical system problems and furnish fleetmen with up-to-date service data. The series will likely run into four or five articles, every one highly charged with practical information. Back of the series is a scouting trip by airplane that took a staff man from Philadelphia to Pittsburgh, Indianapolis, St. Louis, Chicago, Detroit and Cleveland. Two weeks he spent aloft and on the ground.

Peep Into the Future

HE was out collecting other material for you as well. Among other things he was out to learn something about superchargers. What he learned you'll find in an article also in this issue. We frankly admit that it's way ahead of the truck design parade. But then we figure it's our job and your desire to keep at least a few steps ahead of the parade of progress.

Aviation Testimonial

THE use of airplanes in our work, by the way, is nothing new. Most of the members of the staff are aviation enthusiasts and they'd rather ride the air-

lanes any day—no matter how bumpy, than be bumped about on the railroads—no matter how air-cooled. It's not because we resent the unfair attitude of railroads toward highway transportation—and we do; nor because we like to encourage progressiveness—and we do; but just because we like to go places fast. Riding railroads is simply a case of wasting time inconveniently. When we waste time we like to enjoy it.

Three-Point Landing

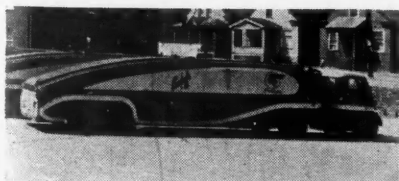
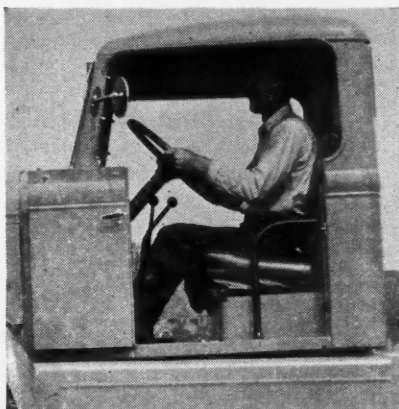
BEFORE we land you should know that a third outcome of that tour for material will be a series on carburetor servicing. We'll begin spraying the facts at you next month. The series will be comprehensive, thorough and prepared from the fleetman's viewpoint.

Boiled—But Not Ham

THE report on the SAE summer meeting is in this issue, and a pretty lengthy report it is. Our excuse to you is that the five subjects covered are important and at that we may have done them some injustice by compressing them all into something like 4000 words. Our wild guess is that the subjects as actually covered by speakers and discussers to whom we listened raptly with only occasional thoughts of



Governor La Follette of Wisconsin is shown signing a law increasing the gross weight of trucks with two driving axles. This law allows an extra 4000 lb. more gross weight to any truck with four wheel drive than is allowed on conventional rear drive trucks, and raises the gross weight allowable to 28,000 lb. on class "A" highways



This is just one of a fleet of 30 Whitehead & Kales streamlined, four-car, double-deck trailers of latest design powered by Chevrolet cab-over-engine tractors which were converted by Montpelier. Anchor Motor Freight, Inc., the operator, will use them to truck GM cars from its new New Jersey assembly plant to dealers' showrooms. The units are attractively painted and striking in appearance



Dodge parades the latest in an emergency patrol wagon for use for such diverse purposes as the long arm of the law can think up. The special body is mounted on a 1½-ton truck chassis. A wide rear step will accommodate at least two bluecoats for as long as they will cling to the railing on each side. The interior of the body will accommodate 12 additional passengers comfortably

Autocar introduces a novel method of door construction for the cab on its model S chassis. The chief function of this door construction, of course, is to make it possible for the driver to get in and out easily. When a door can't slide away, it's better folded away than torn away which is what would happen if it was tied open. It is shown above in open and closed style

The Overload

golf, ran well over 50,000 words. So, what you've had boiled out for you is meat, and we ought to recognize meat because we're not vegetarian.

Help! Hints! Help!

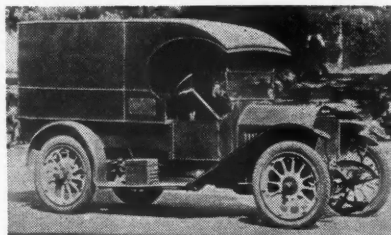
FLEETMEN write us that they like the Shop Hints we've been publishing. We do, too. And we'd like nothing better than to have all fleetmen use the Shop Hints department as a clearing house for ideas which are mutually helpful—ideas for which we will gladly pay. The reward is still \$5 per hint. And remember, we don't care how rough your sketches are; we have artists who will doll them up for publication. And, remember also, if your hint is such that a photograph is needed to tell the story, you give us the details, ask us to send a photographer around (no matter where you are) and you still collect \$5.

Candid Shots

THE bus field is out of the sphere of this publication's operations. Our interest is solely in the truck field—and we've enough trouble minding our own business. But when we listened to Bill Cumming, of Surface Transportation, give his views on preventive maintenance of major parts we decided that his ideas were too big to be confined to the bus field and that they deserved a larger audience. We give them to you this month, and if Bill doesn't recog-

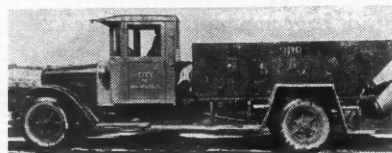


Fruehauf Trailer Co. has issued its new slide rule that reduces to the simplest possible form all truck and trailer restrictions in the 48 states and the District of Columbia. The latest edition of this rule brought up to date as of April, 1937, may be obtained free by writing to L. C. Allman, Fruehauf Trailer Co., 10900 Harper Ave., Detroit, Mich.

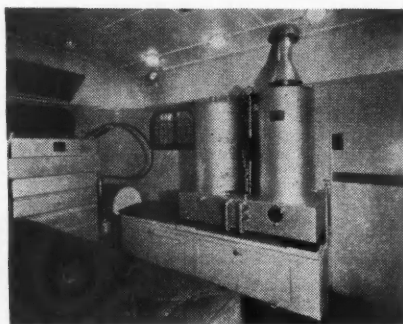


What is probably the oldest truck in the Antipodes is this "Pathfinder" operated by Theodore Bugg, of Melbourne, Australia, who purchased it in 1912, and who has been running it continuously ever since. The truck is powered by a model C2 Continental Red Seal engine. Mr. Bugg says he has driven the truck more than 400,000 miles and makes regular trips of 250 miles every week.

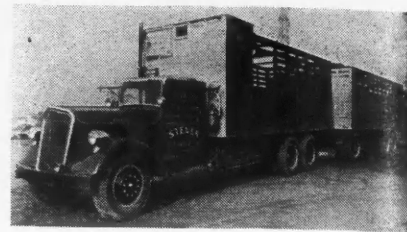
nize the photographs he so very kindly sent us it is because our retoucher did a better job than Bill's candid camera. He'll know what we mean, if you don't—and this is intended as an open letter of thanks for his cooperation.



The lowly and redolent garbage truck has gone high hat in Minneapolis where the city fathers are replacing the old fleet of salad wagons with new up-to-date, streamlined, sliding door, sanitary truck units with extra wide cabs to accommodate two garbage gentlemen. The garbage bins are mounted on GM chassis and have a capacity of eight cu.yd. each. Shown are the old and the new



Circo Products Co.'s cleaning caravan has taken to the road to demonstrate to servicemen the cleaning merits of Circo products. This interior view shows the 18-ft. trailer which is equipped with a Cyclone Cleaner and a Rex Vapor Degreaser for cleaning automobile and truck chassis and engines



Diesels come to Bisbee, Arizona, with the purchase of this unit by Stevens Grocery Co. who is now operating this new Kenworth truck powered by a 150 hp. Cummins bus-type diesel on a tortuous schedule between Bisbee and Los Angeles covering approximately 8000 miles monthly. Stevens obviously goes in for heavy hauling, too. Note the third axle equipped truck and trailer

For "Am Photogs"

CANDID cameras lead us right into news that will be welcomed by amateur photographers. The Ford Motor Co., Dearborn, Mich., wants action pictures of 1937 Ford V-8 trucks. For each glossy print accepted they will pay \$10. The pictures must show trucks at work with the radiator and nameplate in plain view. Prints of 8 x 10 size are preferred but 5 x 7 will be considered. Advertising releases signed by all persons in picture and owner of truck should accompany each entry. The Ford company will furnish them.

Cost Comparison

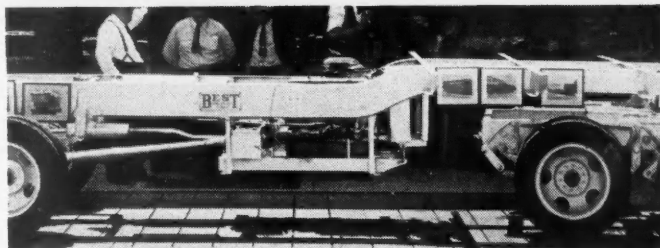
THE Autocar Co. recently made a study of operating costs in a mixed fleet with trucks of various sizes. The costs covered 3,000,000 miles of operation and the various elements showed up with the following percentages: Drivers, 35.47; Gas, 21.33; Depreciation, 11.23; Parts, 7.25; Insurance, 7.13; Tires, 5.03; Labor (repair), 4.12; Housing, 3.05; Oil, 1.53; Taxes, 1.28; Interest, 1.02; Supplies, 0.87; Grease, 0.52; Paint & Wash, 0.17. In the Gas costs, are Gas Taxes amounting to 6.64 per cent of the total operating costs.



When Studebaker held its convention at South Bend, Ind., recently it featured a huge truck display and demonstration at the company proving grounds. The photo shows every practical type of truck body in use mounted on various types of Studebaker chassis. Sales reps from all over the land gave them the once-over

EARS

TO THE *Ground*



The Best Trailer Co., Los Angeles, Cal., is building a motorized four wheel semi-trailer. The power is applied to the front semi-trailer axle by means of a standard Ford or Chevrolet engine clutch, transmission, torque tube and drive shaft. The trailer is for attaching to tractors using the identical drive units. The controls are synchronized hydraulically.

Nash Note

Nash, which frequently has been anonymously referred to in these columns as having designs on the commercial field, has gone and done it. However, we have pretty good reason for suspecting that the company will not long be content with merely a commercial line. Extension of activities into the truck field proper is merely a matter of time.

Ring Rarity

Stranger than fiction or political fact is exhibit A. It is a piston ring listed on the roster as both a compression ring and an oil ring. It is a wide channel ring, one piece, with two diameters. The upper border of the channel has about 1/16 in. larger bore than the lower border. The upper border is to serve as a compression member and the narrower lower border handles the oil until such time as it is conducted through the vent. What it amounts to is an undercut channel ring. The manufacturer claims: prevention of carbon on ring and groove, prevention of oil into combustion chamber and elimination of dilution.

Safety Solution

Mr. Herfurth, of the Seaboard Freight Lines, is thinking of a wire kit containing all of the ICC requirements as well as a lug wrench and jack. The kit would be sealed but an inspector could see all items without breaking the seal. Meantime necessities would be stored in one place and drivers would have to stop playing dry cleaner with the fire extinguisher fluid. Mr. Herfurth would like to know what you think of the idea complete at about \$35.

Wheel Wad

A new universal wheel straightener should be ready for description in time for our next issue. The equipment will service all types of wheels. In the meantime our midwest agent gets ten demerits

for not finding out if it has a static or dynamic balancer.

Test Tribe

The Potter Co., Chicago, are willing to tip their mitt so this department's usual skill was not required to get information that the company is announcing a portable gas analyzer 9½ in. by 8¼ in. by 13 in. overall and weighing 14 lb. complete. And right from headquarters we hear that this is only the first item in a complete line of engine test equipment.

Ripe Rumors

This department apparently has competitors in the business of piecing together bits of information and translating them but none so accurate. At the expense of the other evaluators of the innuendo this department tells you that there is no immediate possibility of a Ford camelback. This all got started when Ford gathered up some camelbacks, including some of the English Ford camelbacks, and took pictures at the Ford plant. This department took pictures of a streamlined train but didn't build any.

Foreign Flavor

So quietly did Chevrolet slip into the specifications with a camelback Diesel that this department almost failed to notice it. Our usual alertness saved us and our stern conscience saved you since there was no announcement. However, it is not as exciting as it might be because the trucks are for export only. They are powered by Hercules engines.

Transmission Tension

This paragraph will just beat an announcement from a passenger car factory to you. This announcement will offer you a fully automatic transmission as an option for \$80. Looking ahead you can gamble on it being standard equipment on the same car next year.

Job Junta

Literally fighting to get to the print shop so that it may be displayed where interested parties can take advantage of it is an item which this department has uncovered. This item concerns the possibility of three jobs for men who can get distributors and call on fleets for a truck equipment manufacturer. One man is required for the southeastern territory, one for the northwest and possibly one for New York. This department will be as cautious as usual about its handling and only the interested manufacturer will get a look at any communications addressed to us for delivery.

Fuel Filter

A manufacturer who has been making filters for various fluids used in industry for some time has announced a filter for Diesel fuel. It has a removable element which can be replaced in one minute and the line of filters includes one of the proper size and density for any size Diesel engine. The filter will handle any grade of fuel oil at any temperature from one to 100 lb. per sq. in.

Vacuum Vestige

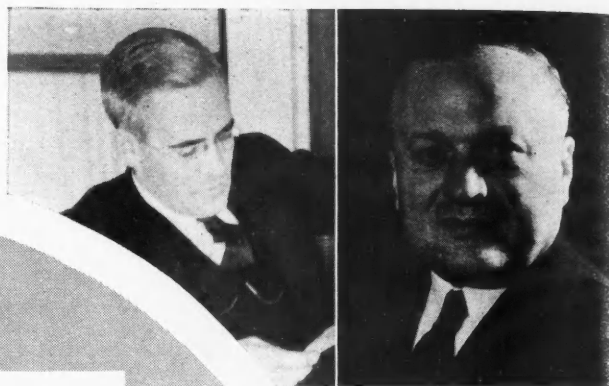
One of our agents has followed a new vacuum power brake and its accompanying paraphernalia and personnel from California to Chicago where it set up shop with an avowed determination to attack the eastern market. A description should be forthcoming.

FREE

Mark X and mail, as usual, to the Editor, Commercial Car Journal, Philadelphia.

- ☐ A—32 pages on oil filtration called a Treatise on Clean Motors. Not a catalog.
- ☐ B—A catalog of Standard Public Utilities Equipment by American Coach and Body Co.

Name
 Title
 Firm Name
 Address
 City
 No. Trucks No. Cars



3

4

SAE

**CAB-OVER-ENGINE TRUCKS
VEHICLE PERFORMANCE ...
OIL TEMPERATURE CONTROL
DIESEL ENGINES & FUELS ...
and ... HYPOID LUBRICATION**



2

**... Receive an Overhauling by Fleetmen and
Factory Engineers at Annual Summer Meet-
ing of the Society of Automotive Engineers**



1

By GEORGE T. HOOK, Editor, Commercial Car Journal

THE five subjects enumerated in the accompanying headline vied with three golf courses for the interest of truck engineers and fleetmen at the annual summer meeting of the Society

of Automotive Engineers held at White Sulphur Springs, W. Va., last month. A count of noses would have given victory to the subjects in all cases but hypoids and diesels, the latter losing

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Photographs of transportation men who played an active role in the SAE summer meeting at White Sulphur Springs, W. Va., last month and who are referred to in this discussion are of (1) Stephen Johnson, Jr., chief engineer, Bendix-Westinghouse; (2) Merrill Horine, sales promotion manager, Mack Truck; (3) John Orr, Equitable Auto Co.; (4) Pierre Schon, transportation engineer, General Motors Truck; (5) Austin Wolf, automobile consultant, N. Y.; (6) Robert Cass, assistant to chief engineer, White Motor Co.; (7) B. B. Bachman, vice-president and chief engineer, Autocar Co.; (8) Ellis Templin, automobile engineer, Los Angeles Department of Water & Power; (9) Fred Faulkner, manager, automotive department, Armour & Co.; (10) Clinton Brettell, superintendent of garages, R. H. Macy (Messrs. Orr, Johnson and Faulkner were chairmen of sessions)

out because they came at the end of a six-day meeting when most of the truck group were heading back home.

Cab-Over-Engine Trucks

Cab-over-engine trucks received a major overhaul in three papers dealing with their place in transportation, their status and advance in design, and their maintenance as against that of conventional trucks.

Pierre Schon, transportation engineer of General Motors Truck & Coach, delved into the historical background of cab-over-engine design, sketched its advantages in today's transportation scheme and made several interesting predictions.

Apparently the pioneers of the truck industry had the right idea because 30 years ago the C.O.E. was accepted design.

"The failure of the early American truck builders to provide more pleasing appearance in the front-end construction," according to Mr. Schon, "had perhaps a much greater influence in discontinuing this type of vehicle than any of the basic design principles. Advantages of short length, better load distribution, etc., were of lesser importance for, at that time, there were no drastic size and weight restrictions, no problems of load distribution due to legal axle weight limitations. Traffic congestion, as we know it today, did not exist. All these were contributory factors in favor of adopting the more graceful conventional design which followed the constructional lines of the passenger car. Perhaps the 'knockout blow' was given when in Government specifications for war equipment the

forward location of the cab was entirely eliminated on all standard vehicles."

Mr. Schon suspected that the appearance of the early C.O.E.'s may have been partly responsible for the laws in several states requiring motor vehicles to halt when approaching a horse and remain stopped until the horse and wagon had safely passed.

The streamlined appearance of today's C.O.E. designs, in Mr. Schon's opinion, is a highly important inducement for accelerating public demand.

"Operators throughout the country," he said, "are conscious of the advertising value derived from a vehicle which attracts attention, and no single development in truck design during the last 25 years can compare with the advertising value incorporated in 1937 C.O.E.'s."

An even greater spur to expansion of usage, he admitted, are the basic operating advantages in meeting legislative restrictions. He summarized the advantages of cab-over-engine design as follows:

"1. Less overall length for a given length of loading space.

"2. Shorter wheelbase for a given length of loading space.

"3. Greater facility in handling in congested traffic and narrow streets.

"4. Less storage space required.

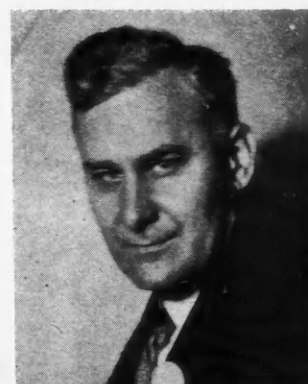
"5. Less space required at loading platforms.

"6. Less space required in street, whether vehicle is moving or standing.

"7. Better distribution of load.

"8. Greater safety—because of better visibility.

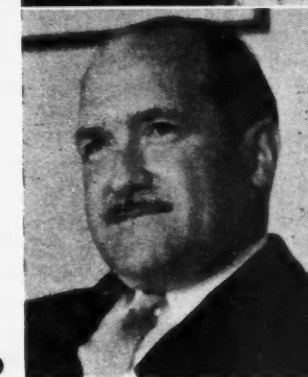
"9. Advantages in meeting legal size and weight restrictions.



8



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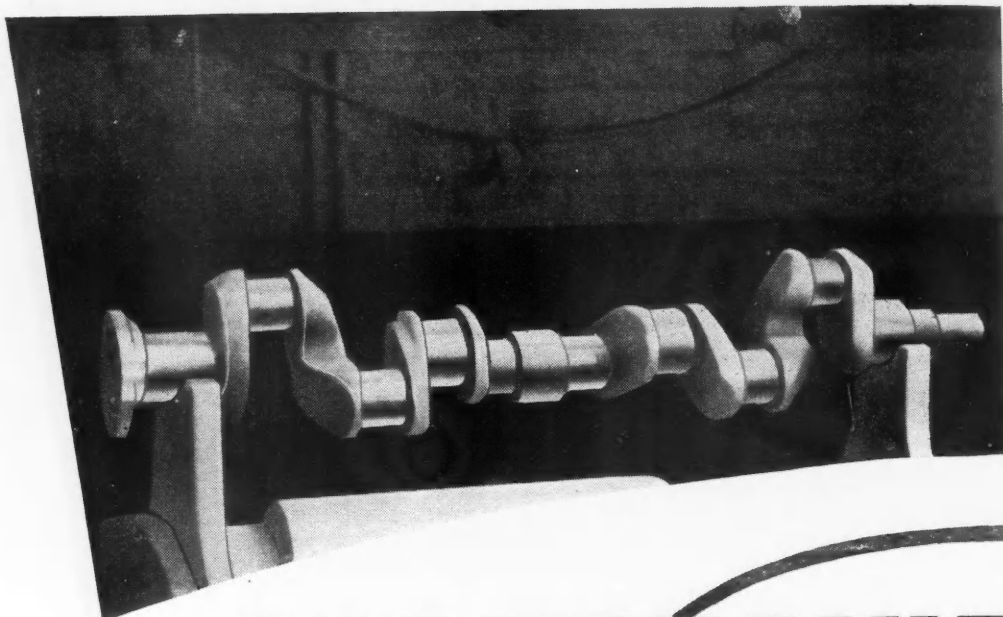
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"10. Attractive appearance and greater advertising value."

The first seven were fully recognized by the early builders. In the discussion that followed, Fred Lautzenhiser, transportation engineer of International Harvester, suggested the addition of the following:

"11. Smaller tires with ample capacity for a given gross weight.

(TURN TO PAGE 84, PLEASE)



PREVENTIVE MAINTENANCE AS APPLIED TO

Fleetman's Research Covers Oil Change, Engine Wear, Cylinder Reconditioning, Valves, Piston Rings, Conrod Bearings, Transmissions, Axles

BEFORE describing our preventive maintenance scheme it seems necessary to call attention to the fact that the procedures involved have been worked out over a period of years, and have been selected because they have proven satisfactory for our specific operating conditions. The time elements involved or the processes described may, or may not, apply to other operations, than our own, for preventive maintenance requirements can be designed only after operating experiences have been intelligently analyzed.

We have a special method for the assembly of these operating experiences, which really constitutes a daily log of each bus, and these mileposts of operation, guide us from year to year in the proper selection of inspection, unit replacement, and repair periods.

A scheme such as will be described, if faithfully adhered to, prevents interruptions to schedules and equipment failures. We adhere religiously to set inspection periods, and under no circumstances, will tolerate these periods, exceeding maximum allowances.

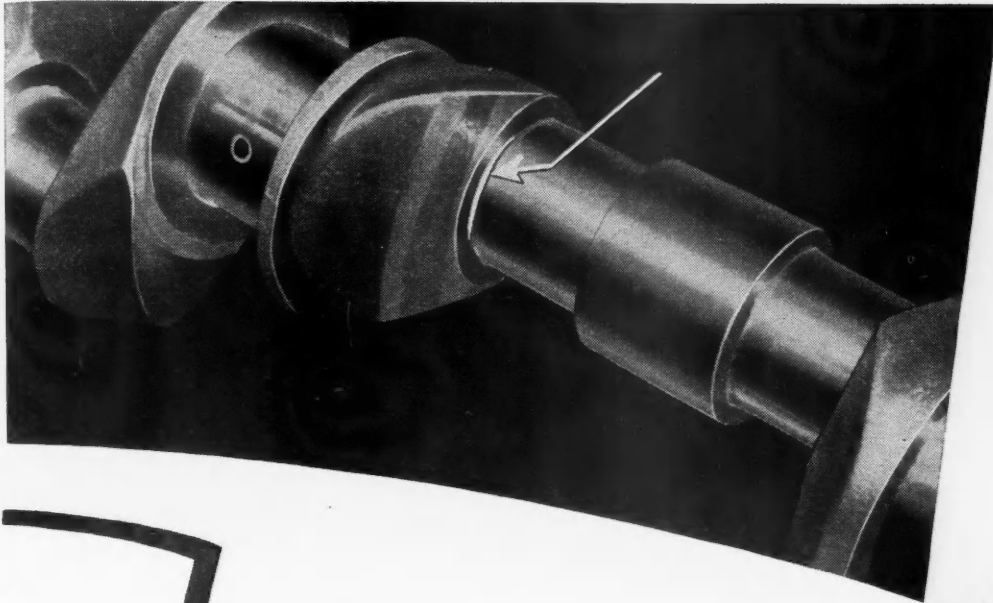
First a description of our inspection procedure regarding engines, for in our fleet, the engine, because of its complex design, offers more failure possibilities than either the transmission or the axle.

Inspection periods for engines, disregarding fueling, oiling and external cleaning, occur at 900 to 1000 miles, at 2500 to 3000 miles, and 20,000 to 30,000 mile intervals. The 10,000-

* This article is based on material originally presented at a Philadelphia SAE section meeting. Acknowledgment is made to the author for illustrations taken especially for Commercial Car Journal.

Illustrations at the top show the Magna-Flux method of crack detection on major parts. The arrow in the photo on the right points to a crack in a crankshaft revealed after being treated by this process. Illustrations below show the crankshaft being cleaned and sprayed.



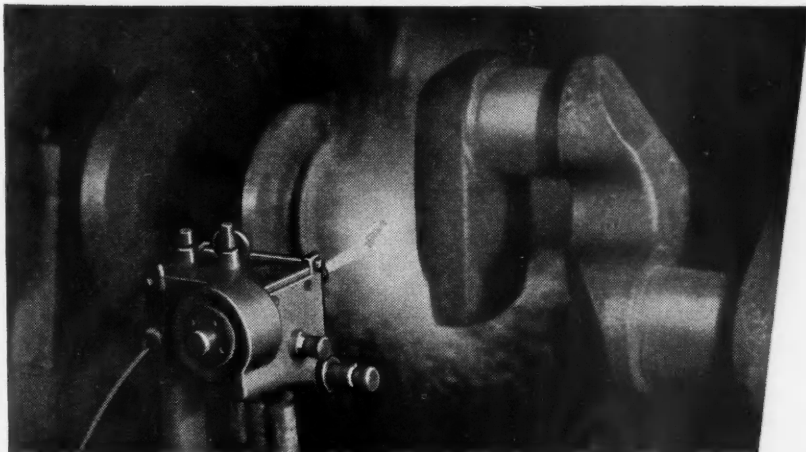


Major PARTS



By W. J. CUMMING, General
Supt., Surface Transportation Corp., New York*

respectively, with high carbon steel on the bearing areas, thereby continuously retaining standard bearing dimensions and prolonging crankshaft life. Both processes can be applied to other parts than those shown



mile spread in the last item, covers six different engines.

At the 1000-mile inspection period, all lubrication instructions for each type of engine are followed minutely, including draining and refilling the crankcase when due, and changing or cleaning oil filtering elements when called for.

At each 2500 to 300-mile inspection, all external units or parts are checked, and if necessary, adjusted or replaced.

At our 20,000 to 30,000-mile inspection, which we call our "long" inspection, all interior parts are checked and cleaned, cylinder bore dimensions are recorded, piston rings are replaced, and valves ground, touched up, or changed. Some slight variations in the internal inspection procedure occur at regular intervals, namely, when the cylinder block wear limit is reached, at which time, the block is replaced by a resleeved block, and when the main bearing and crankshaft replacement period arrives.

Since we find more disagreement
(TURN TO PAGE 94, PLEASE)

Shop Hints

FROM

1. King Pin Pusher By G. E. UPPERMAN

Garage Supt., Continental Baking Co.,
Wheeling, W. Va.

WE have made a tool for removing all model Ford king pins which has saved a lot of time in our shop. It is made from two pieces of 4 in. by 1 in. by 10 in. steel, two lengths of 1 in. by 22 in. of cold rolled steel and four 1 in. SAE hexagon nuts. The bars are drilled near each end to take the cold rolled lengths which are threaded on the ends and held in place with the nuts. One bar has a 2 in. hole drilled in the center for the king pin to pass through.

A round piece $\frac{7}{8}$ in. by 3 in. undercut $\frac{1}{8}$ in. at one end for about $\frac{3}{4}$ in. is used as a plunger and the power used to move the king pin is an ordinary hydraulic jack.

1A. Distributor Studs

When we have Ford V8 distributors out of the chassis we replace the hold down cap screws with $\frac{5}{16}$ in. carburetor studs just long enough to hold nuts. With the studs instead of the cap screws the distributor is easy to remove and replace.

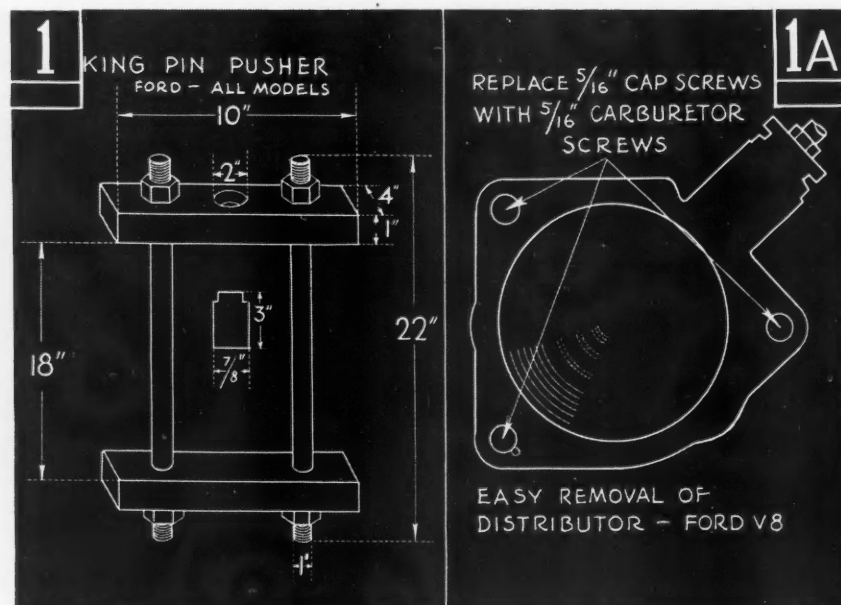
1B. Drain Cock Opener

To reach drain cocks in tight places we made a tool that works as an extension handle on the cock. It is simply a length of $\frac{3}{16}$ in. welding rod made into a loop handle on one end and made U shaped on the other end to grip the drain cock thumb and finger grip. The length of rod between the loops can be determined by the distance necessary to reach the drain cock on your equipment.

2. Cracked Distributor Repair By HARRY E. METZ

Mechanic, Erie County Highway Dept.,
Clarence Center, N. Y.

IN an emergency it is possible to repair a cracked distributor head by scraping out the crack with a knife until it has been thoroughly cleaned out and then filling the cleaned-out crack with shellac or sealing wax. This is of course a temporary repair and it is doubtful how long a distributor head would operate



this way, but it serves in an emergency. A coil cracked between terminals can be treated the same way with good results.

3. Wheel Drive Flange By F. W. GREEN Oshkosh, Wis.

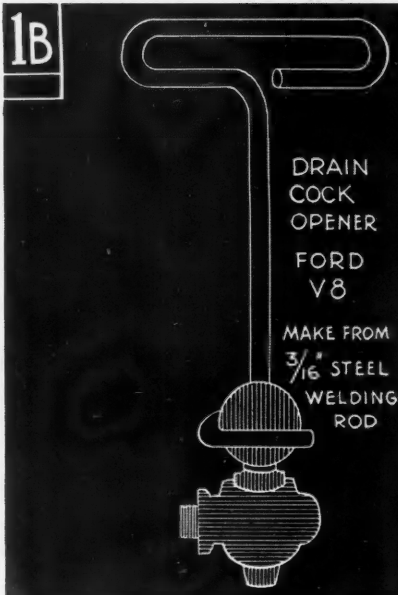
WE have a device that enables trucks to get home when one of them equipped

with cast iron wheels sheers the axle shaft studs off while out on the job. One piece is a driving plate $\frac{1}{2}$ in. thick and 6 in. wide. It is long enough so that it will just fit inside the diameter of the tire rim. There is a hole drilled in the center of the plate for the axle shaft to go through and eight small tapped holes so that studs can be installed fastening the plate to the axle shaft. The ends of the driving plate are cut out so that they



.. Will Be Paid by Commercial Car Journal for Each Shop Hint Accepted. Ideas Count—No Matter How Rough. We Will Polish Them Up for Publication

FLEET SHOPS



will fit over two opposite tire rim lugs and over the ends of the wheel spokes which are against the driving plate.

Two small plates with holes cut to fit over the rim lug bolts are used and these fit across the ends of the driving plate. After the rim bolts are re-installed the plate is held tight against the wheel and the axle shaft is held in place. The whole device can be carried in a tool box and can be installed by a driver.

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3

PLATE UNDER TIRE LUG TO HOLD PLATE & AXLE SHAFT IN HOUSING

LARGE PLATE BOLTED TO AXLE SHAFT WHICH DRIVES WHEEL

AXLE SHAFT BOLTED TO PLATE

SPACE CUT OUT TO FIT OVER RIM LUG

2

CRACK

SCRAPE CRACK WITH KNIFE & FILL WITH SHELLAC OR SEALING WAX.

Illustrations are of (1) King Pin Pusher, (1A) Distributor Studs, (1B) Drain Cock Opener, by G. E. Upperman; (2) Cracked Distributor Repair, by Harry E. Metz; (3) Wheel Drive Flange, by F. W. Green; (4) Manifold Leak Tester, by Ralph Baggailey, Jr.; (5) Connecting Rod Sleeve, by J. M. Wells

4. Manifold Leak Tester By RALPH BAGGAILEY, JR.

Supt. of Equipment, McCrady-Rogers Co., Braddock, Pa.

SOME portions of the inlet manifold to cylinder block joint surfaces are obscured so that a leaky connection cannot be detected by the usual method of applying oil to the joint and observing if it is drawn in.

For such cases we have a tire valve brazed onto a $\frac{1}{8}$ in. pipe nipple which we screw into the intake manifold after removing the windshield wiper fitting. After backing off on the throttle stop screw to permit the butterfly to close tightly we apply an air chuck to the tire valve. The existence and general location of a leak is then known by the hissing sound created and it is accurately

located by feeling for the air escape with the fingers.

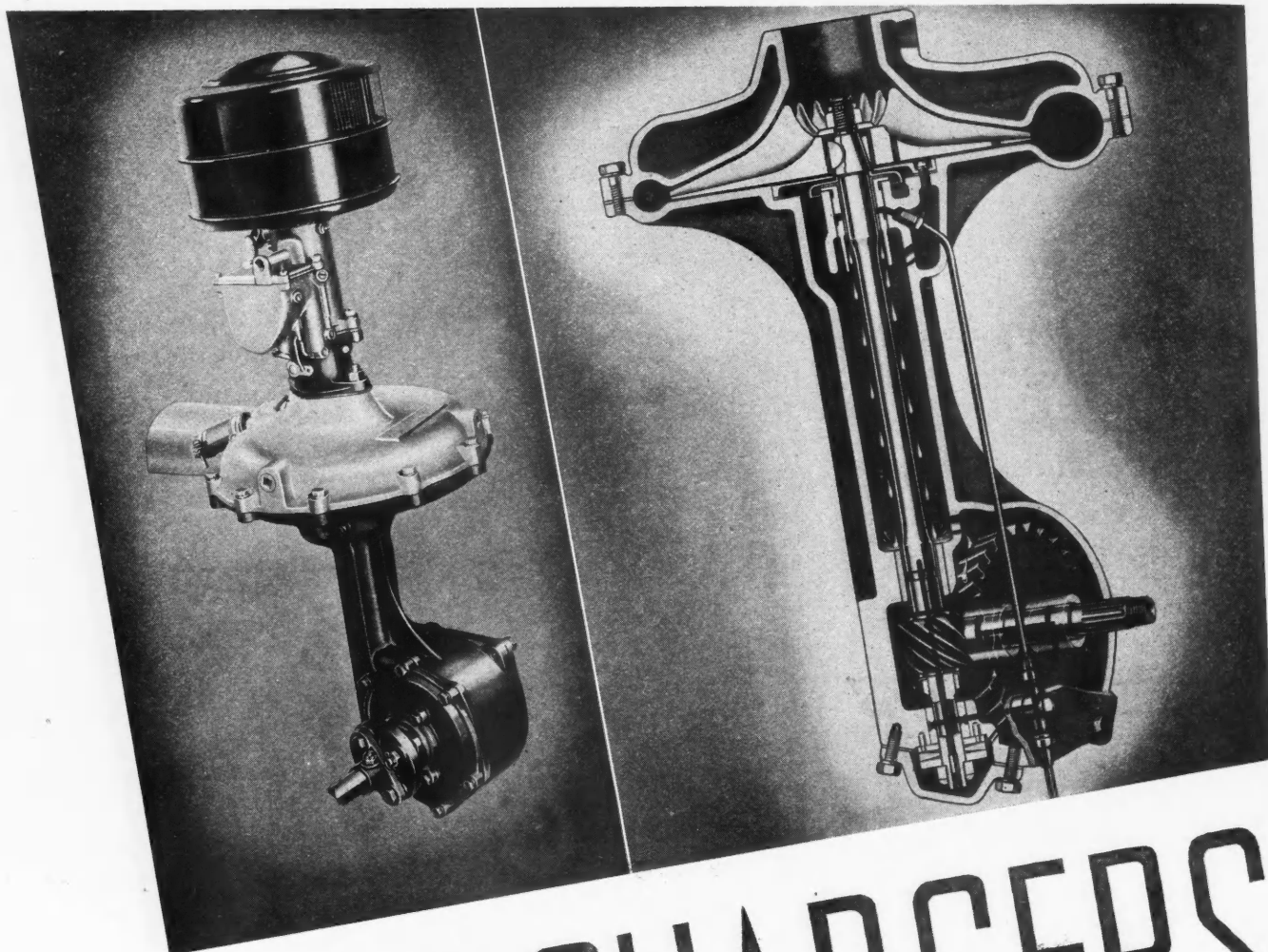
Contrary to the normal supposition, the air does not readily leak through the engine because the cylinders having the intake valve open have the exhaust valves closed and so the pressure is held on top of the piston.

5. Connecting Rod Sleeve

By J. M. WELLS

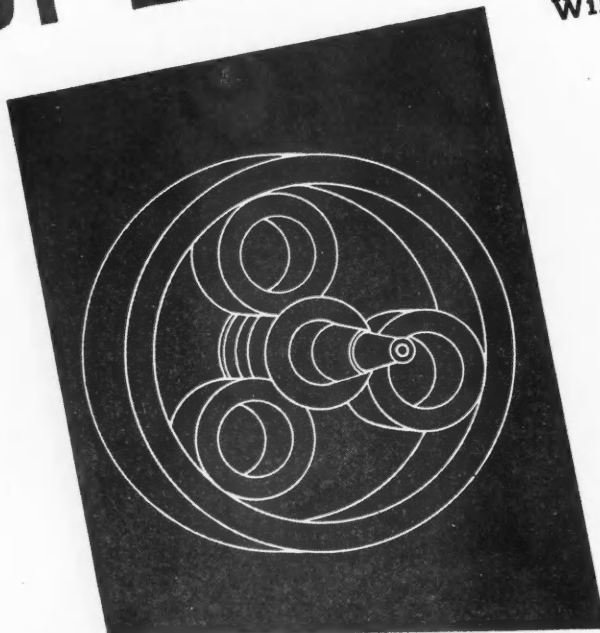
Mechanic, Ray's Creamery,
Logansport, Ind.

WHEN fitting connecting rods to crankshaft in engine without pistons, place a piece of radiator hose about 6 or 8 in. long on the piston end of the connecting rod. This keeps the rod from scratching and gouging the cylinder wall when the engine is cranked to test the tightness of the bearing.



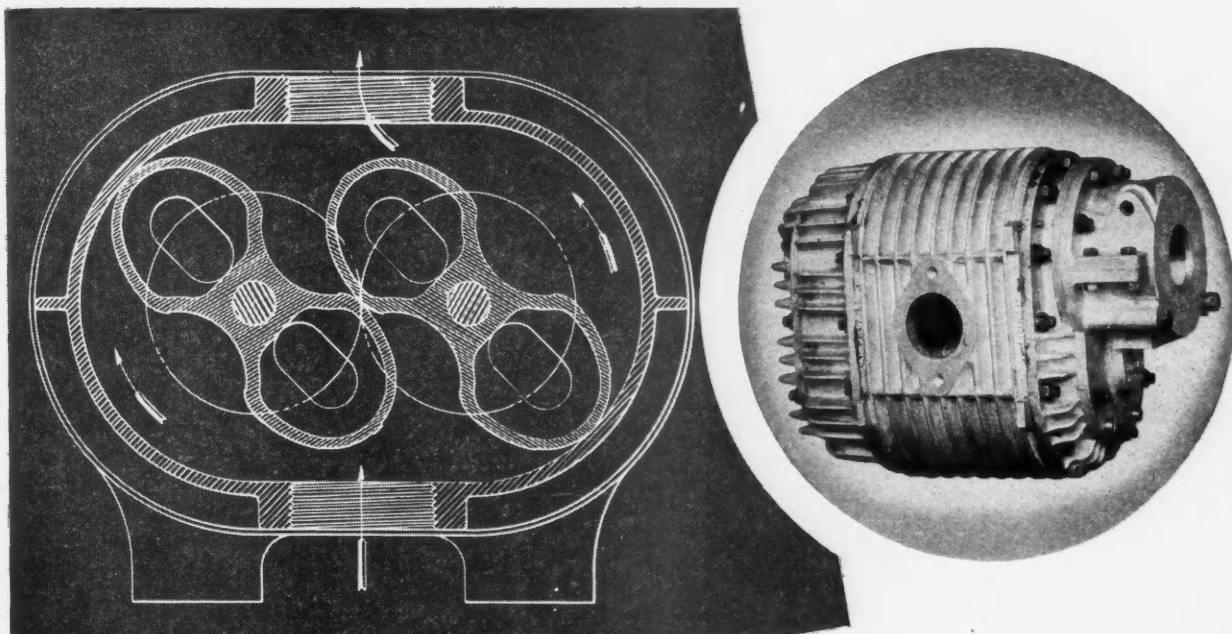
SUPERCHARGERS

Will Trucks Take a Page From



IN order to get more power from smaller engines truck designers may in the near future take a page from auto racing history and install superchargers on truck engines. All bus manufacturers are exploring the possibilities of this device for increasing power without increasing engine size and at least one manufacturer has installed a number of them on inter-urban buses where more power is required to meet arduous schedules.

The supercharger is nothing more or less than a pump which uses engine power to drive it while it pumps a heavier than normal charge into the cylinders so that each cylinder produces



Opposite page—Showing assembled unit and cutaway view of centrifugal supercharger. Above—View of assembled unit and working drawing of a positive displacement supercharger. Drawing at bottom of opposite page is of a planetary friction drive used to operate either type

—A Blow for More Power

Racing History and Use "Blowers" to Get More Power Out of Today's Engines?

By HENRY JENNINGS, Technical Editor, Commercial Car Journal

more power on the power stroke.

In an engine that is not equipped with a supercharger the only means of getting gasified fuel from the carburetor to the cylinder is by the suction that is created by the individual piston when it travels downward on the suction or intake stroke. The piston travels downward creating a partial vacuum above it and when the intake valve between the intake manifold and the cylinder is opened by the camshaft the fuel rushes in to the cylinder to equalize the vacuum which exists as a result of the piston travel. Obviously there is a limit to the amount of fuel that can be induced into a cylinder by this method. Since the power developed by an internal combustion engine is directly proportional to the weight of the charge burned in the cylinder a pump which would increase the weight

of the charge would increase the power.

The weight of air is in direct proportion to the absolute pressure so when an engine cylinder is filled by a charge that has been sucked in by vacuum the weight of the air that as entered the cylinder is less than the weight of the same volume of air in free atmosphere. If some mechanical means were used to compress the air as it enters the cylinder the weight of the air inside the cylinder would be greater than the weight of the same volume of air in free atmosphere. The weight of the compressed air in your shop compressor air tank is greater than the same volume of free air.

Since the supercharger creates a denser, heavier air charge and the gasoline increases in the same proportion, the explosion resulting after the compression stroke will be more powerful.

In that a supercharger makes for a denser charge at the time of ignition the installation of a supercharger produces the same effect as when increasing the compression ratio, but there it stops. Increasing the compression ratio does not increase the total weight of the charge. It might be said to prepare it more efficiently for ignition by making it possible to compress the same volume of gas into a smaller space thus making it more dense, but raising the compression ratio does not increase the amount of fuel and air which is conducted into the cylinder. The supercharger creates a more dense gas at the time of ignition by putting more into the cylinder in the first place.

However, do not get the idea that all of the power increase created by the supercharger is "gravity." It takes

(TURN TO PAGE 123, PLEASE)

GETTING FROM BEHIND THE "EIGHT BALL" WITH

THE pooling of automotive equipment is not new to public utilities. Many utility companies have been operating automotive equipment through some form of pooling for a number of years. Most of these might be termed mixed or partial pools in that they incorporate certain parts of the several different pooling theories that seem best to suit local conditions. These set-ups usually provide that certain passenger units are held for the use of executives or are assigned to certain members of the organization and are used by them both for company business and personal use. Other units are held for general use and in some cases there are various plans for reimbursing employees who find it necessary to use their personal cars on company business.

Except where cars are held for general use, all of these arrangements leave something to be desired, not only from the standpoint of economy and

THIS is the "equipment pooling" article promised last month in our report of the SAE public utility fleet operator meeting. Since that promise was made the public utility concerned has expressed a desire not to have its name identified with the article for the customary public policy reasons. This restriction does not impair the value of the pooling system which is here revealed for the benefit of all operators with a similar problem.

Describing a System That Has Effected Worth-While Economies for a Public Utility Fleet

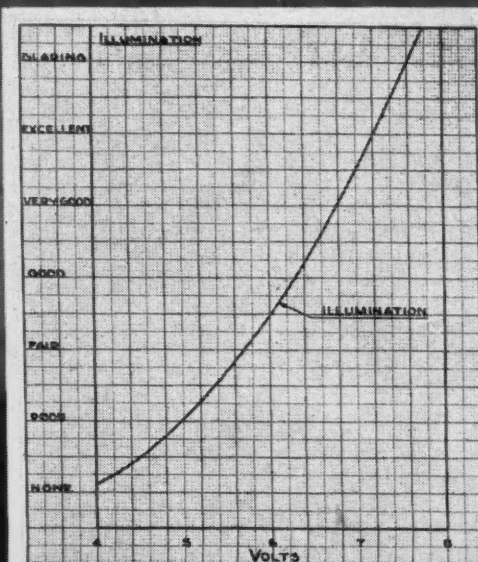
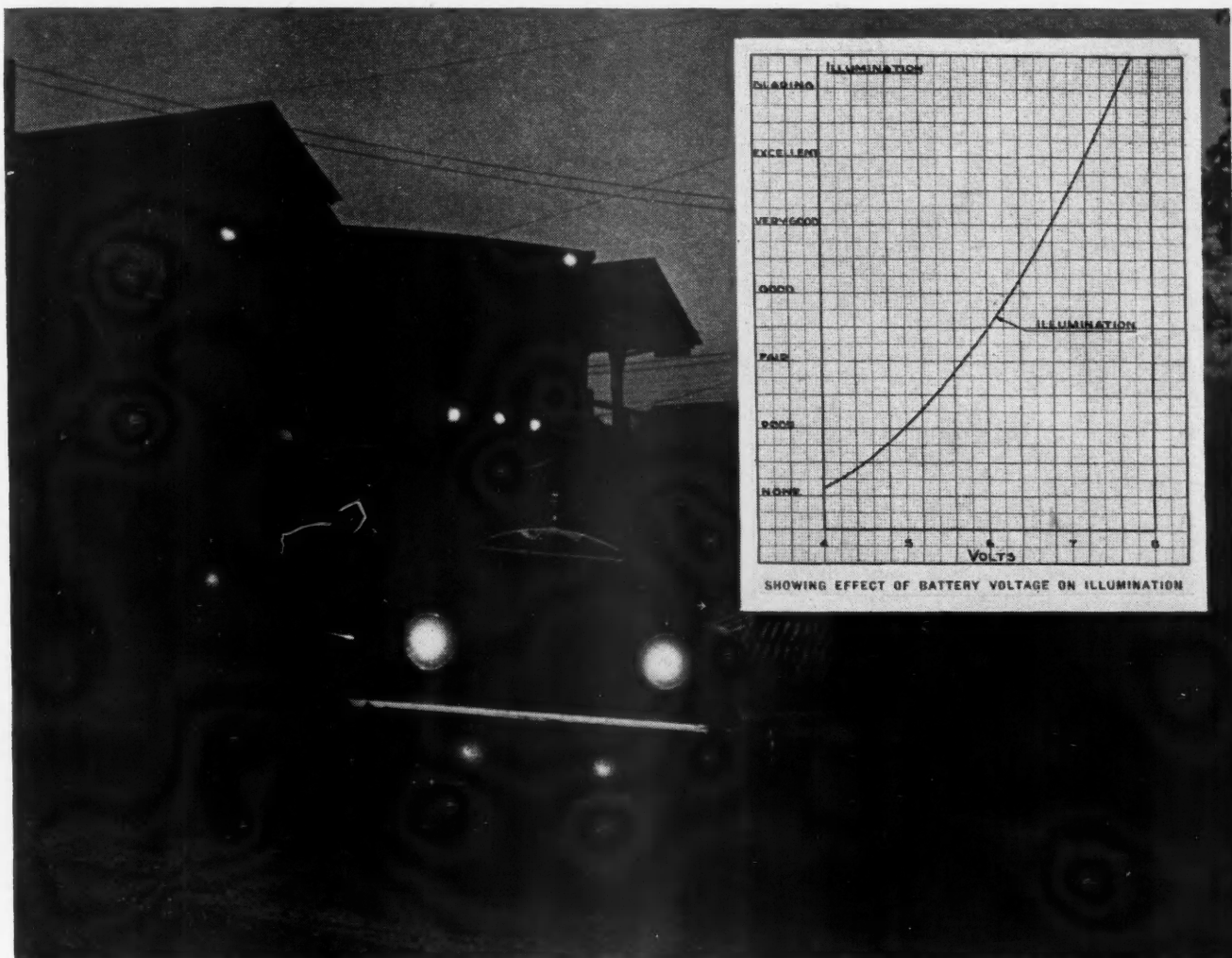
efficiency, but also from that of peace and harmony. There is always the question as to how far down the line should the policy of reserving cars for executives go and how far up the scale should the company go with respect to the quality of the vehicle thus provided. It is evident that unless someone's feelings are to be ruffled there are going to be several thousands of dollars invested in nice, big, shiny automobiles that do not do enough work to justify their presence in the pool.

The practice of definitely assigning cars to members of the organization not only has all of the objectionable features just mentioned but a lot more besides. While in the case of this type of operation the starting point is easily determined, the location of the stopping point becomes very much like a desert mirage. You think that you see it but never quite reach it. There are several excuses advanced for using this type of operation such as the necessity of having transportation available to certain employees for use in emergen-

cies or that the nature of the work of certain employees is such that transportation must be available at all times.

A check up covering two or three years will probably reveal that, in the (TURN TO PAGE 70, PLEASE)

DAILY REPORT MOTOR VEHICLE		
20M-4 24 37		
Vehicle No. _____	Date _____	19__
District _____	Dept. _____	
Time Out _____	Time In _____	
Speedometer Reading In _____		
Speedometer Reading Out _____		
Total Mileage _____		
Driver _____		
Description of Work _____	Account _____	Miles _____
RECORD OF TIRE CHANGE		
Vehicle No. _____	Date _____	19__
Tire Removed: L.F. _____ R.F. _____ L.R.I. _____ R.R.I. _____ L.R.O. _____ R.R.O. _____		
Make and Serial No. Tire Removed _____		
Make and Serial No. Tire Applied _____		
Speedometer Reading When Tire Was Changed _____		
Following Repairs Necessary on This Vehicle _____		
Signed _____		



SHOWING EFFECT OF BATTERY VOLTAGE ON ILLUMINATION

ELECTRICAL Series

Batteries take it on the chin from many fleet operators when in reality they are not even in the ring. The bout is really one of current requirements vs. current generation and this makes the battery the chef in the current generation training camp and not one of the principals. Still some fleet operators apparently figure the battery to be the original source of power and continue to try to take more out of it than is put into it by the generator.

There are still fleet operators who, when a 13-plate battery goes dead every 30 days, replace the battery with a 15-plate battery and wonder why it goes dead every 40 days or so. The best rule of thumb method of deciding upon battery size and capacity that COMMERCIAL CAR JOURNAL has heard of is that the battery six-hour discharge ratio should be equal to the total electrical load of the vehicle.

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CAN BATTERY FAILURES BE CHARGED TO

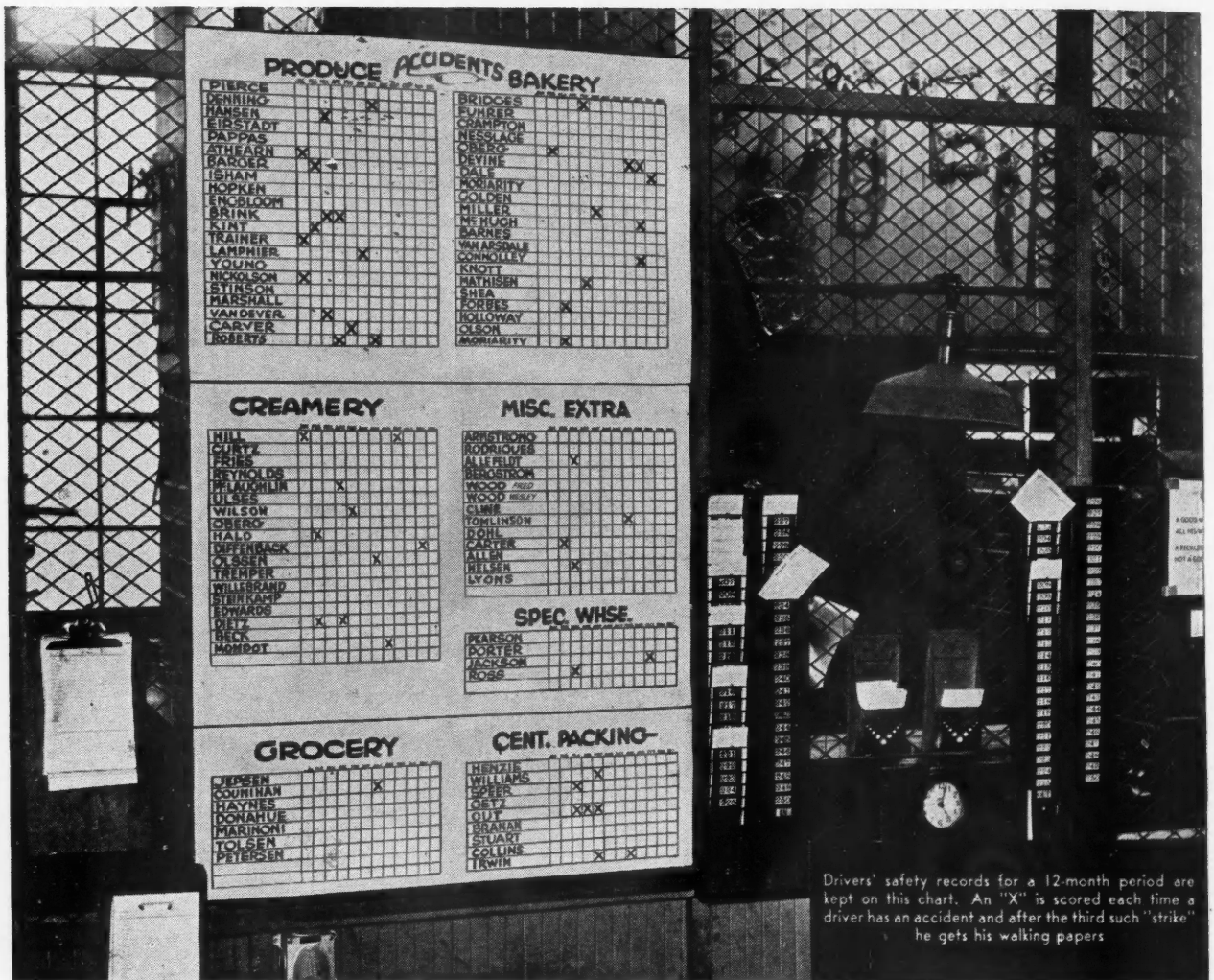
Generators?

When the Light Load is Too Heavy for the Battery is It a Heavier Duty Battery That's Needed or Does the Fault Lie With Generator Selection and Maintenance?

This does not mean that the battery will operate the vehicle for six hours under full load with a dead generator because the battery is not fully charged in normal operation. Four hours with-

out a generator is about the safe limit to expect.

The standard equipment battery may or may not be satisfactory. The truck
(TURN TO PAGE 69, PLEASE)



Three STRIKES

**.. In Any Man's Ball Game and In the Game of
Stores; Drivers With Three "Strikes" In Any**

ALTHOUGH we do not maintain nor tax our drivers' minds with a long set of prescribed rules and regulations regarding the promotion of safety, we do have a very definite and rigid method of achieving that end. It has proved its value in the results attained, for we not only preach safety and insist upon it—we actually *have* it!

Our drivers know that their jobs depend not only on careful and cautious driving, the exercise of prudence and the observance of a recognized mode of procedure in effecting the safe operation of our trucks, but on a consistent absence of accidents.

And when I say accidents, I do not mean merely serious accidents or those involving great damage to the vehicle, loss of life or injury to person. I mean any kind of an accident, no matter how trifling. A mere dent in a fender is the result of an accident and

our drivers are so instructed and thoroughly realize that to retain their positions their records must be almost entirely clear of all such mishaps. This is how we do it:

We have one big rule, which overtops and submerges all others and to which we adhere unswervingly. If one of our drivers has three accidents, no matter how trivial, in one year, he automatically loses his job, unless he can show—and the burden of proof is on him—that the accident was caused by someone else and that he, himself, was blameless! This is the way the plan operates and the way it works out:

Beginning with Jan. 1, 1936, we prepared a huge chart, showing all of our drivers' records as to accidents, and posted it in the most conspicuous place in our shops. We have 123 trucks and 109 drivers in the Oakland division of

Safeway Stores. Each driver's name was placed on a line opposite a row of 12 squares, one for each month of the year, each group of men listed under the heading representing the division of the company in which he is employed. Whenever—or perhaps I should say *if* ever, for the majority have flawless records—a driver has an accident, a check mark, in brilliant red, is placed in the square for that month, opposite his name. We make no provision for more than one check mark in any one month, for that almost never happens—never has, at least, except in one instance, of which more later. If a driver receives three marks in the year, the record in the case, with all of the facts in our possession, is submitted to headquarters and if the officials are not satisfied, beyond question, that the apparently offending employe was without fault in at least one of the instances,

out he goes. If he is able to show that in one of the situations involved he was not responsible, he retains his job, but is not by any means given a clean bill of health. He remains in the shadow, so to speak. He is placed on probation and if another mark appears in his record that year, he gets another thorough investigation, and faces dismissal.

With the close of the year 1936, the completed record for that year, the first one in the use of the plan discussed above, discloses some interesting facts. We consider that the plan has thoroughly justified itself and that not only has it proved a decided preventive of accidents—or at least a definitely discouraging influence in that regard—but that it also has demonstrated rather conclusively the efficiency and carefulness of our drivers. We are able to show with certainty now, what we, ourselves, knew well before, that our drivers are safe drivers!

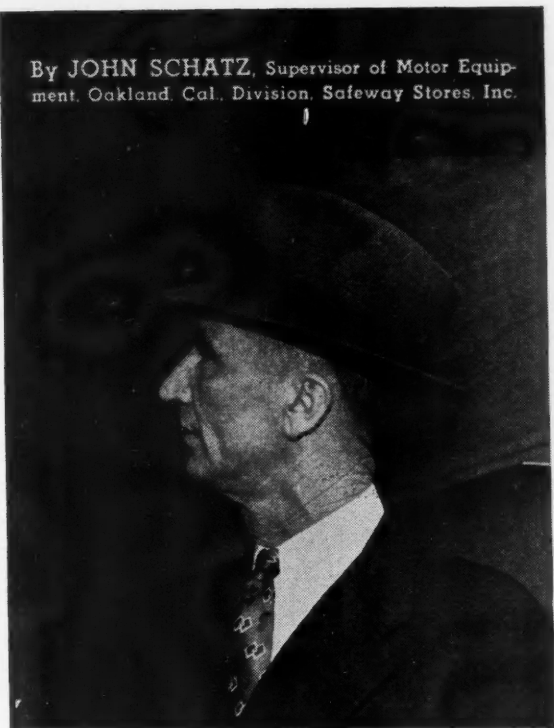
During the year of 1936 our 109 drivers were concerned in 49 accidents, which is less than one accident in an entire year to every two drivers. Nearly all of them were what might be termed trivial accidents—no great damage was done, that is—and, what is perhaps the most important feature of the record, in all but three of them investigation showed that the driver was blameless. And those three accidents in which the driver was held responsible were all the work of one man!

Of the 109 drivers, 68 had no accidents whatever, only six had as many as two accidents and 34 had one each. This in addition to the one who had three. We consider this a remarkable record, when it is remembered that even an accident wherein no blame attaches to the driver goes into his record just the same. Someone, for example, may back into or scrape his truck when it is parked and he is not even present. Think back over your own operation of your car and try to remember how many times it has received a bump or a dent or a scratch when you considered yourself absolutely without fault and you will be able to appreciate something of the difficulty of maintaining an unblemished record in our company.

OF the six drivers charged with two accidents each, most of them ran into their difficulties at fairly widely separated intervals. The only one of our drivers who was unfortunate enough

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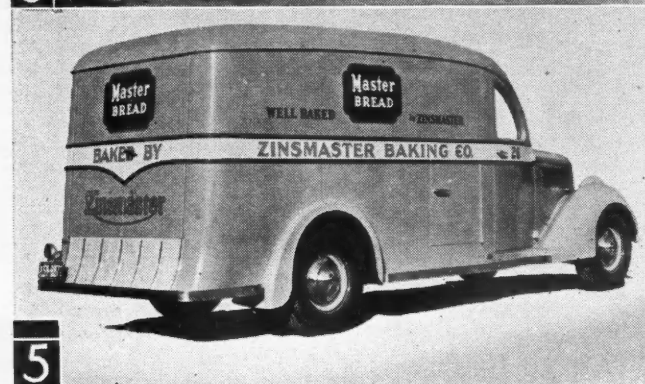
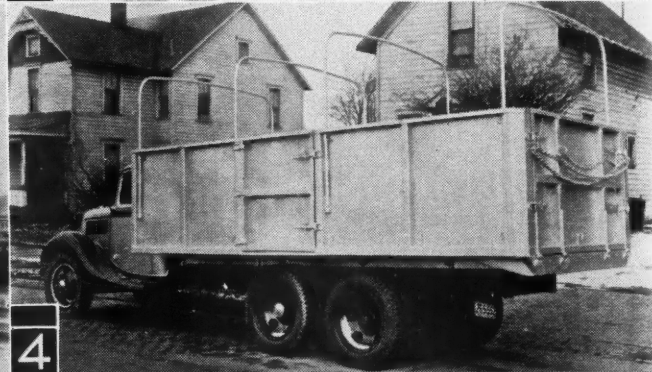
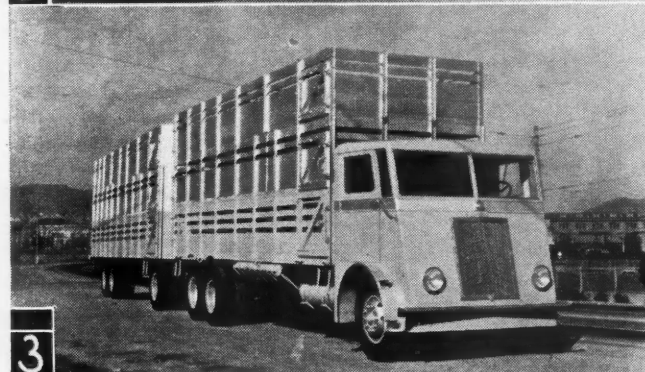
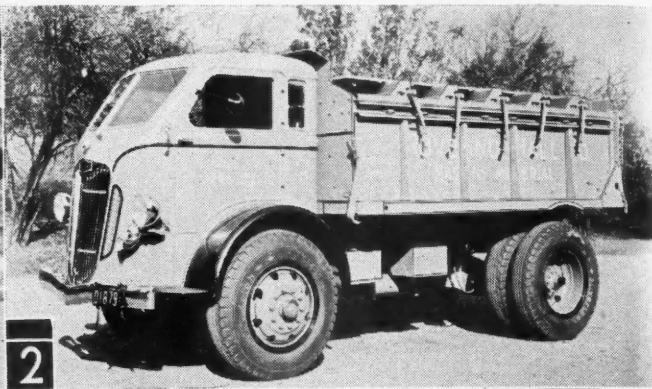
By JOHN SCHATZ, Supervisor of Motor Equipment, Oakland, Cal. Division, Safeway Stores, Inc.



ARE OUT

**Safety Played by Safeway
12-Month Period Are Out**

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1. BOYERTOWN AUTO BODY WORKS, INC., Boyertown, Pa., built this unusual refrigerator body to a design patented by the operator, J. A. Weiland. Insulation is with DRY-ZERO Sealpad throughout except for cork in the floor. The body has several compartments. The rear one is used for smoked meats and is not refrigerated but is insulated. Body dimensions are: 108 in. long, 60 in. wide, 60 in. high. The front refrigerated compartment is 36 in. deep. The aisle between the front and rear compartments is 24 in. wide. The front compartment for fresh meat is refrigerated. The refrigerated compartment is kept at 45 deg. for 12 to 15 hours with only 50 lb. of ice in the bunker, allowing for an average of 135 door openings. The refrigerated section is divided into smaller compartments for different kinds of meat. The coldest section is at the bottom for loin cuts. The ice bunker is wedged-shaped steel tank into which is fitted a V-shaped extruded aluminum fin section forming two ducts for the passage of air. Warm air entering from the top is cooled by passing through the finned areas and is discharged from it into the middle and lower compartments. The body is made integral with the cab and has a 3-ton capacity. Chassis is a FORD.

2. AUTOCAR Model US of 128-in. wheelbase is used in construction work of the Midtown tunnel under the Hudson river, between New York City and New Jersey. It totes a HEIL steel dump body of 7 yd. capacity and is equipped with a No. 6 hoist. Body interior is divided up to handle 6 different batches of material. Operator is Rovegno-Hall Co., Jersey City.

3. THIS FAGEOL stock truck-train has plenty of stuff! It's a model 370 RAD cab-over-engine job powered with a WAUKESHA 6D-140 diesel engine. The super-structure of the truck body and trailer body may be detached easily if it is expedient to do so. Trailer and bodies were built by Utility Trailer Co. The train is 60 ft. long.

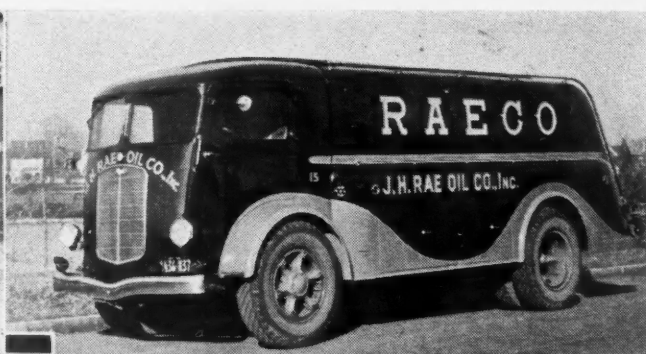
4. PERFECTION STEEL BODY CO., of Galion, Ohio, built this splendid body of 12-gauge high tensile steel made by the AMERICAN ROLLING MILL CO. This material absorbs 5000 ft. lb. per sq. in. of impact which is nearly twice what ordinary steel takes. The body is used for hauling grain and measures 42 in. deep and 87 in. wide. The truck is 16 ft. long. Chassis is a FORD. The third axle unit is also Perfection's.

5. BREAD may be well baked by Zinsmaster but this body is well done by the FLOUR CITY BODY CORP., Minneapolis, who built it using for insulation 1½ in. of DRY-ZERO SEAL-PAD in roof, sides and ends. The body is lined with galvanized sheet metal and measures 9 ft. long, 5 ft. wide and 54 in. high inside. Note the half door on the side giving access to merchandise at the front of the body. Chassis is a FORD.

6. REST your eyes on this while Dr. Scholl goes about making the foot-weary happy. The classy body was built by GENERAL BODY CO., Chicago, using DRY-ZERO insulation. It is mounted on an AVAILABLE semi-trailer. A DIAMOND T tractor is at the bow. The body itself measures 25 ft.



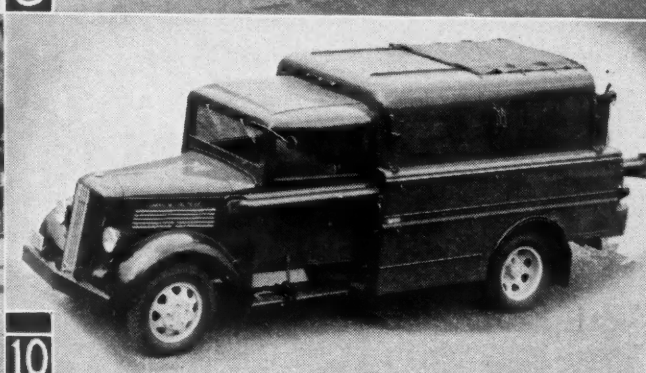
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11

The ALBUM

of Modern Truck Transportation Equipment

7. PIPE all hands on deck! **WHITE** (here); **TRUXMORE** (here); **ST. PAUL HOIST** (here). And **National Ice and Fuel Co.** is all set for smooth sailing. The c.o.e. White is a model 805, the Truxmore third axle is a model 25 and the St. Paul hoist is a model 85UB. The dump body is 12 ft. long and measures 6 ft. 8 in. wide and 52 in. high inside.

8. MACK MODEL CJ cab-over-engine tank truck is a fine example of streamlining of which the **Rae Oil Co.** is proud. The tank capacity is 2300 gal. carried in four compartments.

The shroud around the tank telescopes over the cab to give the appearance of a single piece unit. A power reel carries 250 ft. of hose.

9. VICTORY CORP., certainly scored a victory when it took over this 3-ton **DODGE** for daily runs of 120 miles to points in Connecticut. An open top body is mounted on it and the rack provides for a tarpaulin. Note the tool chest under the body. The strongly contrasting finish of light against dark colors makes this truck easily visible on the highway.

10. GMC is right up on the ball when a general purpose **COMMERCIAL CAR JOURNAL**
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utility truck is in demand by the **Commonwealth & Southern Corp.**, Michigan. The special cab will accommodate seven men and is built to extend into the body making more space available for material. Space from back of cab to rear axle measures 84 in. This body was designed by **Commonwealth** and embodies utility features.

11. MAJESTIC LAUNDRY has good reason to strut with this smart delivery body on the job. It's a product of the **METROPOLITAN BODY CORP.**, Bridgeport, Conn., who will convert any light-duty $\frac{1}{2}$ or $\frac{3}{4}$ -ton chassis into a door-to-door delivery job. The engine is covered with an insulated housing that is easily removed. This chassis is a **CHEVROLET**.

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After Hours

EDITORIAL COMMENT

By GEORGE T. HOOK, Editor

Will Trucks Be Made to Move Faster on Grades?

THERE are indications that sanity is about to catch up with those operators who, disregarding the public interest, have not hesitated to buy equipment greatly underpowered for the purposes to which it is put.

The hills of this country have quaked under the plain and fancy cussing that has been directed at slow-moving trucks and combinations by irate motorists and by drivers of faster moving trucks. Now, something apparently is going to be done to correct this condition because it is being seriously discussed by highway authorities, by regulatory groups, by truck manufacturers and by legislators.

As might be supposed the problem is being attacked from a safety angle. It has long been contended that snail-paced trucks in hilly country are a menace to motoring safety because following motorists, exasperated to the point of desperation, take chances in passing. Accidents that occur under such circumstances are blamed indirectly on the slow-moving vehicles. There probably isn't a man who reads these words who hasn't taken the risk of passing under such dangerous circumstances—and damned himself for doing it, and the slow-moving vehicle for putting him on the spot.

The remedy that is being proposed is a so-called performance or ability factor. It is generally expressed in per cent of grade at a specified miles per hour. The ability factor most frequently advanced is a 4 per cent grade at 20 m.p.h. Both the American Association of State Highway Officials and the several National Conferences on

Street and Highway Safety have recognized the slow-moving vehicle as a safety hazard. In their uniform standards both groups made substantially the same recommendation: That it shall be unlawful for any person unnecessarily to drive at such a slow speed as to impede or block the normal and reasonable movement of traffic, except when reduced speed is necessary for safe operation or when a vehicle or combination of vehicles is necessarily, or in compliance with law, proceeding at reduced speed.

"It is well recognized," says an official report of the National Conference on Street and Highway Safety, "that the unnecessarily and unreasonably slow operation of a motor vehicle on highways carrying heavy traffic may cause not only inconvenience but extreme hazard to the rest of the traffic attempting to proceed at higher speed. The effect of such slow driving is frequently to induce operators of vehicles in the rear to attempt overtaking and passing in the face of oncoming traffic."

The minimum speed recommendation was recognized 10 years ago by highway experts as a safety requirement but nothing has been done to make it effective. The revival of interest at this time is largely due to an increase in slow-moving vehicles during the depression period. Truck equipment, no one in the truck industry will deny, was underbought and oversold during the business slump as never before. Operators who normally would have made the equipment fit the job, went to inadequate equipment in order to cut down capital expenditures. Other oper-

ators to meet competitive conditions spent as little as they could for as much as that little would buy. Unquestionably many of the improperly fitted trucks are children of the slump. With better business conditions they will doubtless be replaced by adequate equipment.

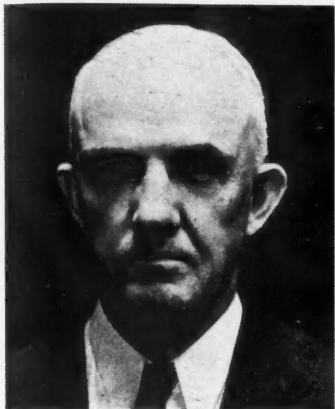
BUT it is likewise, and unfortunately, true that the industry always has had, and always will have unless something is done about it, the type of operator who chisels in his business dealings and chisels in his buying. His unfairness is apparent in everything he does, and to the public at large this unfairness makes itself apparent in the vehicles that he puts on the highways. Overloaded, underpowered and purposely unidentified they winch themselves over normal grades at 2 and 3 miles per hour with engines winding up at speeds they were never meant to sustain, with hoods ripped away to give the over-worked engine every possible gasp of air. It is this type that has been responsible chiefly for the anti-truck attitude of the general public, and that has abetted the railroads in getting acceptance of their anti-truck propaganda.

The tendency has been to hold the over-the-road operator responsible for the public's antipathy to trucks. Over-the-road operators have not been guiltless but then neither have other trucking vocations. Within the week the writer himself has trailed a beer truck, a coal truck, a dump truck and a freight-hauling tractor trailer on a suburban highway on barely perceptible grades at speeds that never exceeded the middle point on the 0 to 5 calibration of his speedometer.

Such conditions on highways that must be shared with passenger cars give the truck industry no leg to stand on in combatting efforts to make trucks move faster. On the operators' side the suggestion is often heard that wider roads will solve the problem. The suggestion has merit where traffic is heavy and is, in fact, given serious consideration in modern highway planning. But in most cases the suggestion is not feasible not merely because of the heavy expense of road-building but because truck transportation is in no position to bear the added cost of such road construction—and it would be morally obligated to do so for creating a condition that made such construction necessary.

THE alternative that is being proposed is the performance or ability factor. At the moment there is no general agreement on a factor, although discussions have centered on a 4 per

(TURN TO PAGE 126, PLEASE)



Commissioner Lee: He balked

I. C. C. Cracks Down



Commissioners Eastman and Caskie: They put their feet down

On CONTRACT *Carriers*

EITHER the complete supervision and regulation of private carriers or their virtual elimination from the field of motor transportation is forecast in an April decision of the Interstate Commerce Commission prescribing the form of contract which must be entered into between "contract carriers" and shippers.

"Contract carrier" represents a new word coinage which came into use with State regulation of motor carriers and which has now been carried into I.C.C. nomenclature. Actually it is without definite meaning, although the present decision begins a legend which may crystallize its meaning.

Although the motor carrier law grants to the Commission the single right to specify minimum rates as a bulwark against cutthroat competition, the Commission expands the meaning of the law and decides that hereafter all contracts and agreements made by private carriers which, under the interpretation, makes them "contract carriers" shall be in writing, shall provide for transportation for a particular shipper or shippers, and shall be "bi-

lateral" covering a series of shipments during a stated period of time.

It is obvious that the Commission has toyed with the word "bilateral," that it has liked the sound of it and has imposed it upon the motor carrier industry as an important sounding condition to be embodied in every contract carrier contract. Holding that a contract carrier as distinguished from a common carrier is "free to pick and choose among shippers" and that such carriers may circulate freely, picking up business here, there and everywhere, the Commission opines that the

inherent and inevitable disadvantages visited upon the common carriers by such unrestricted acts become "a source of positive peril to them when their contract carrier competitors become promiscuous in their dealings with shippers, shop around among them freely and confine their actual contracts to individual shipments." Fearing destructive competition and holding that Congress sought to abate it, the Commission proposes in its decision to enlarge the powers conferred upon it by Congress and extend a paternal

(TURN TO PAGE 66, PLEASE)

Stipulation That Contracts be in Writing for a Specific Shipper, be Bilateral and Impose Obligations On Carrier and Shipper and Cover a Series of Shipments During a Stated Period of Time Foreshadows Complete Regulation

By HALL JOHNSTON, Former ICC Attorney-Examiner Now Engaged in Private Practice in Washington



New AUTOCAR

THE Autocar Co., Ardmore, Pa., has taken another important step in its invasion of the light duty field. It has made available the recently-announced models A and B in cab-over-engine models which will be known as models UA and UB.

Despite heavier steering gears and front axles the new c.o.e. models with cabs actually weigh 100 lb. less than their conventional counterparts. The specifications of other units are the same, the weight saving having come chiefly from shortening the wheelbases and overall lengths without sacrifice of the CA dimension.

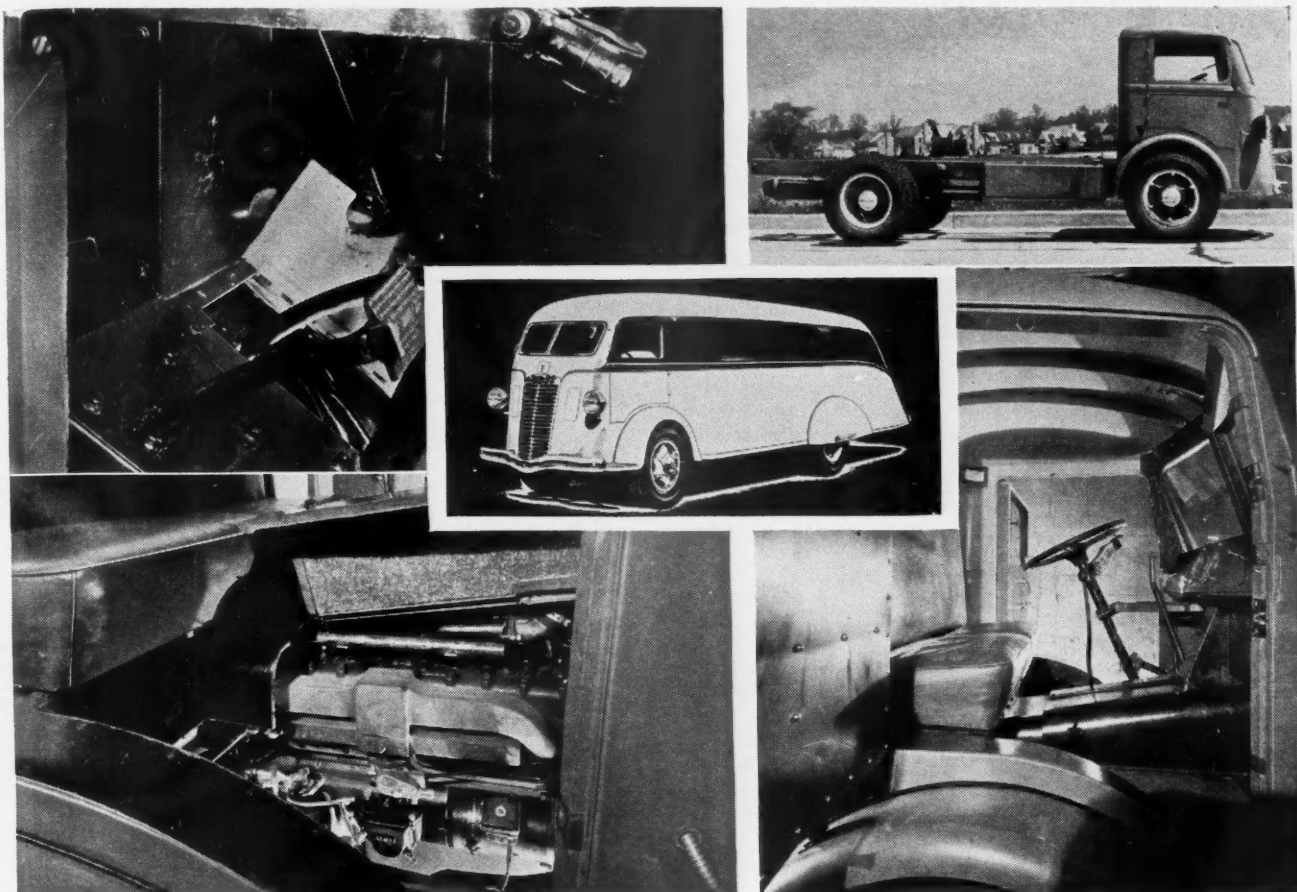
Prices for the conventional and c.o.e.

Trucks in Assembled Line Have Minimum Wheel-base of 84 in. Both Models Weigh 100 lb. Less Than do the Corresponding Conventional Jobs.

model chassis are identical, the A and UA price being \$1095 for a 13,500 lb. gross weight truck, and the B and UB selling for \$1480 for trucks with a gross weight of 16,000 lb.

There is only one cab available for the c.o.e. models at \$250, while on the conventional models there is a standard cab at \$200 and a deluxe at \$250.

The engines in the c.o.e. models ap-



Opposite page—Showing front-end view of Autocar's new UA and UB c.o.e.'s. Note ventilators at sides and radiator cover in center of cab. Above left—Access to the engine is made easy simply by raising the floor board. Top left—A hinged door in the toe board opens up to the distributor and oil filler. Above right—Interior view of the roomy cab. Top right—Over-all view of the new c.o.e. chassis. Center—Showing appearance of the new job complete with panel body

C.O.E.'S

pear to be even more accessible for maintenance work than do the conventional trucks. The new design ingeniously includes a small trap door in the toe board immediately to the right of the brake pedal which gives access to the distributor and the oil filler, while a small square has been cut in the floor board further back to open above the oil bayonet gage. The square can be lifted out by gripping through a thumb hole. A low hood, which extends back through the center

of the floor boards to the seat but does not divide the seat, has two conventional hood latches and after raising the right side of the hood the whole right floor board may be removed by simply loosening two wing nuts and sliding a small metal plate forward. When the floorboard is removed the whole right side of the engine is exposed.

All of the fuses are on a panel immediately behind an instrument board door in place of the usual "glove compartment." The gage and instrument panel, which is hinged at the bottom, may be inspected by loosening two bolts which hold the panel in place at the top. The radiator filler is concealed behind what appears to be a center ventilator in the front of the cab. The ventilating is done through two side ventilators.

THE model UA has a Hercules JXB engine of 263-cu. in. piston displacement, giving 163 lb. ft. of torque and 68 horsepower at 2800 r.p.m. This engine is mounted in a 7 15/16 in. x 2 3/4. x 7 7/32 in. frame of carbon steel. Behind this engine is a Clark 185F four-speed transmission. The shift

lever is in conventional position. The rear axle is a Timken 54412 of spiral bevel drive and of full-floating design. Vacuum-actuated hydraulic brakes act upon 320 sq. in. of brake lining area on four wheels.

The engine of the UB is a Hercules JXC which has 282 cu. in. of piston displacement. Its horsepower output is 73 at 2800. The torque is 175 lb. ft. Bore and stroke are 3 3/4 x 4 1/4 in. The UB has the same transmission as the UA. The brake lining area is 358 sq. in. The rear axle is the same design but a larger Timken.

Both engines have aluminum pistons and seven cadmium-nickel replaceable-type shell main bearings. Connecting rod bearings are also replaceable.

Wheelbases for both models are 84 in., 106 in., and 124 in. 6.50/20 tires with duals are standard on the UA with a maximum allowable tire size of 8.25/20. The UB standard and maximum sizes are identical with the UA.

The new models have a pleasing compact look. Fenders are high crowned and with the Autocar-designed-and-built cab give the front of the truck plenty of eye appeal.

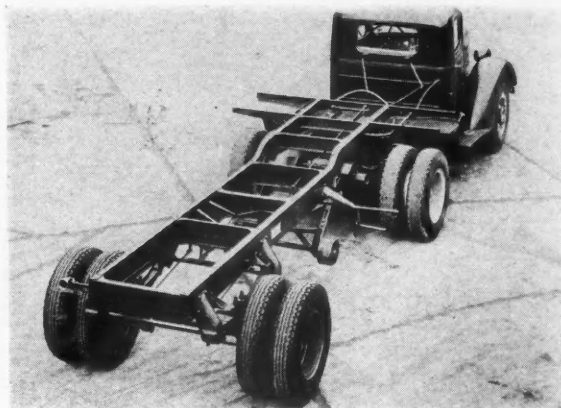
Mack Makes Two New Lighter Semi-Trailers

MACK TRUCKS, INC., announces two new semi-trailers, the ST20 and the ST30, of lighter capacity and lower price than heretofore included in the Mack line.

Semi-trailer brakes are synchronized with those of the tractor. Brake drums are of nickel chromium cast iron. Shoes are rigid, and the boosters are adequately sized. Another feature simplifying the operation of coupling and uncoupling, is the exclusive Mack coincidental safety lock. This device comprises the combination of an automatic parking brake plus an auxiliary fifth wheel lock. The latter consists of two heavy locking pins which protrude through holes in the upper fifth wheel plate so as to overlap the edge of the lower turntable. These pins are extended at all times except when the land-

ing gear is lowered. A safety hook is provided so that if in coupling, the tractor is not backed fully home, the landing gear cannot be raised and the parking brake is locked on.

Air piping of seamless copper tubing which is covered with fabric to prevent chafing and vibration is used. The side rails are pressed carbon steel with seven integrally-gusseted cross-members the depth of the frame. On the ST20 the frame is 9 5/8 in. deep, on the ST30 9 3/4 in. deep. Outriggers at the front are standard. Axles on both models are tubular. On the



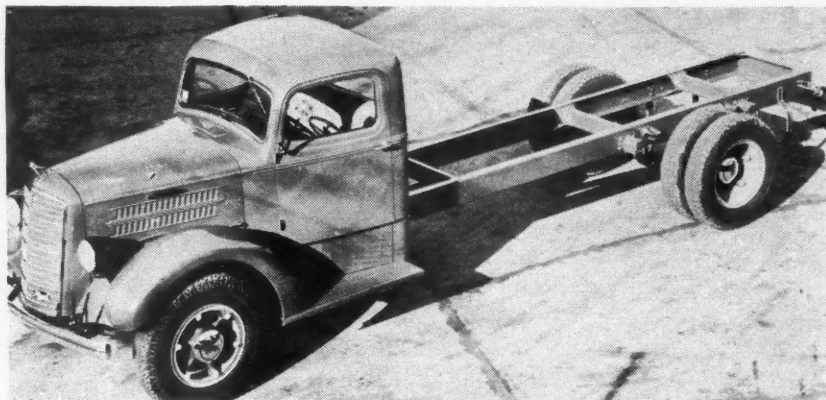
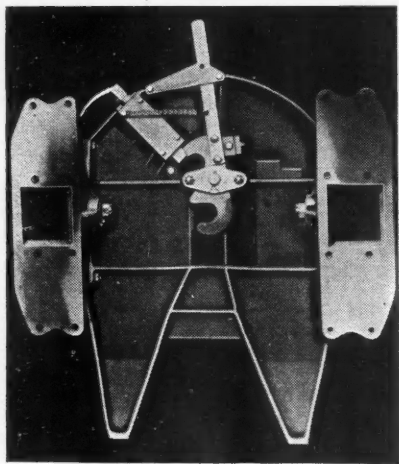
Mack's new "semi" features coincidental safety lock

ST20, axle diameter is 4 1/2 in., on the ST30, 5 in.

Springs are in two sets; main and helper. Main springs, seven in number, are 54 in. x 3 in., each leaf having a thickness of 7/16 in. Spring suspension is by Mack's exclusive rubber Shock Insulators.

New Fruehauf Fifth Wheel

A NEW 36 in. 5th wheel, with specially moulded rubber mounting and only four moving parts, has been announced by Fruehauf Trailer Co., Detroit. The new 5th



Mack truck model EJ, rated at 16,000 lb. gross, is the lightest truck yet built in the regular Mack line. Similar to the Model EH (described here in March) as far as appearance goes, it differs chiefly in that the six-cylinder engine has a cubic in. displacement of 288, compression ratio is 5.5; lb. ft. of torque is 190 and brake horsepower is 84 at 2800 r.p.m. Model EJ is available in four wheelbase lengths from 146 to 194 in. Three tractor wheelbases ranging from 139 to 158 in. are also available

wheel incorporates several features including non-sway design and a ribbed con-

struction which gives ample strength without excessive weight.

New Truck Registrations by Makes by Months

	Autocar	Brockway	Chevrolet	Diamond T	Dodge	Federal	Ford	G.M.C.	International	Mack	Reo	Sterling	Stewart	Studebaker	White-Indiana	Miscellaneous	Total
January.....1937	130	102	14,362	863	3,764	207	16,544	2,820	6,244	389	354	29	92	169	592	948	47,609
January.....1936	75	94	15,124	495	6,207	223	14,606	428	4,743	90	339	8	85	143	493	607	43,760
February.....1937	112	115	7,939	602	5,043	206	16,460	3,051	5,256	364	317	23	101	222	550	1,451	41,815
February.....1936	57	88	14,978	510	5,556	170	12,226	758	4,365	107	217	4	62	134	408	681	40,301
March.....1937	179	140	17,164	849	6,498	241	20,839	4,201	5,826	480	495	23	149	478	655	2,080	60,291
March.....1936	88	127	19,511	634	6,751	205	16,168	1,551	5,395	184	264	17	73	221	477	762	52,423
3 Months.....1937	421	357	39,465	2,314	15,305	654	53,843	10,072	17,320	1,233	1,166	78	342	869	1,797	4,479	149,715
3 Months.....1936	220	309	49,613	1,639	18,514	598	43,000	2,737	14,503	381	820	29	220	498	1,378	2,030	136,489
% Change...3 Mos.	+91	+16	-20	+41	-17	+9	+25	+266	+19	+224	+42	+169	+56	+74	+30	+120	+10

HO HUM

*Hydraulic
Braking* sales are up again!



YES—you've heard this before. Hydraulic Braking sales are up again! Today that statement is no longer news. It's expected. The reasons why are known to every truck operator in America:

Hydraulic Brakes assure smooth, equalized, easy-pedal stopping. They retain their adjustment . . . require little service and no lubrication . . . are sturdy and long-lived.

The result is that Hydraulic Braking has be-

come a potent sales force in the merchandising of automotive vehicles. Not infrequently, it is the determining factor in the choice of a car or truck. Constantly increasing numbers of car and truck buyers demand, first of all, Hydraulic Braking in the vehicles they will consider purchasing.

To borrow a well known phrase . . . "such popularity must be deserved." The truck builder, the truck dealer, the truck operator all agree.

HYDRAULIC BRAKE COMPANY
DETROIT, MICHIGAN

LOCKHEED HYDRAULIC BRAKES

OFFICIALLY SERVICED THROUGHOUT THE NATION BY WAGNER ELECTRIC CORPORATION
COMMERCIAL CAR JOURNAL
JUNE, 1937

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Total

47,609
43,780

41,815
40,301

60,291
52,423

149,715
136,489

+10

JOURNAL
E, 1937

New Products

ON PARADE



Wilco Piston Ring Gauge

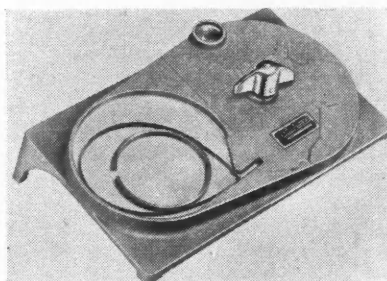
WILKENING MG. CO., Philadelphia, announces the Wilco ring gauge which measures all ring sizes on the same center line.

The illustration shows how the Ring Gauge draws each ring against an angle which automatically maintains the same center line for all rings. Operation is quick and easy. Readings are made on a dial through a powerful magnifying glass in fractions. Undersizes and oversizes in tens of thousandths also are indicated.

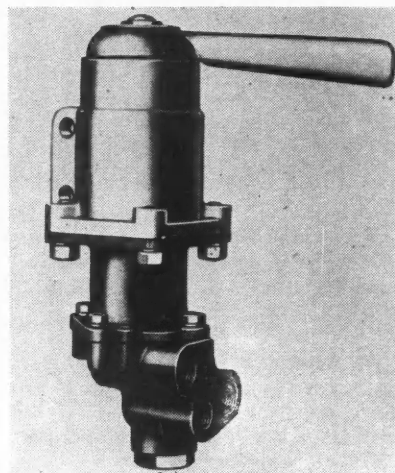
Neither moving parts nor the measuring tape are involved in adjusting the ring gauge. The scale is set at the factory to read correctly. The tape is made of Swedish steel and is fastened securely at each end to prevent stretching.

A master size ring is furnished with each instrument so the accuracy of the reading can be checked at any time. If necessary, adjustment of the dial reading is made simply by moving the scale to the right or to the left so it points exactly to the size on the dial corresponding to the size of the master ring.

The dial and all working parts are inclosed. The Wilco ring gauge measures all rings from 2 in. to 6 3/16 diameter.



Wilkening piston ring gauge



Midland brake control valve

Model F-1 Fram oil filter



Brake Control Valve

A NEW hand control valve for air brakes has been announced by the Midland Steel Products Co., Cleveland.

A feature of this valve is that it is "fully compensating," meaning that any desired amount of air pressure (up to maximum tank pressure) can be released and maintained by application of the valve. In this way the speed of trucks and tractors can be checked gradually. Also the speed of trailer units may be checked slightly in advance of the tractor brake application, thus assuring the operator of more complete control in eliminating "jackknifing." The valve has been designed for use with Midland-Christensen air brake equipment.

Fram Oil Filter

FLEMING MFG. CO., INC., Worcester, Mass., announces an addition to its line of FRAM oil and motor cleaners. This will be known as Model F-4, and is similar to Model F-1 in the action of the filter on the oil, but is different in construction. The

cartridge has a tube vertically through its center, through which a pipe pass, connecting with the bottom outlet. The oil enters through the inlet, passes through the cartridge and filtering element and down the pipe through the outlet. The cover can be removed for change of cartridge by simply removing a single nut. A FRAM oil-condition gauge, which automatically indicates when a new cartridge is needed, is included with every complete filter.

Upholstery Fabrics

THE United States Rubber Products, Inc., is manufacturing at its plant in Mishawaka, Ind., a complete line of upholstery fabrics particularly suited to the truck fleet use. These fabrics include Naugahyde and Hydrex upholstery materials and Naugalite head lining material.

Naugahyde is an artificial fabric, of which the surface coating is a combination of ground leather and rubber having a patented treatment to produce a tough, wear-resisting finish. It is available in a variety of colors, grains and two-tone effects as well as in different weights and fabric backings.

Hydrex is a material similar to Naugahyde and has the same basic construction. It is produced to meet the demand for a good upholstery material in the low-priced field. Hydrex is available in a limited range of colors.

Naugalite head lining material is a rubber and leather-coated fabric furnished on different fabric backings in plain colors and various grains. It is used for head and side-wall lining or as trimming. This material may also be purchased double with punched wool felting for better insulation and sound-proofing qualities.

Gar Wood Crane

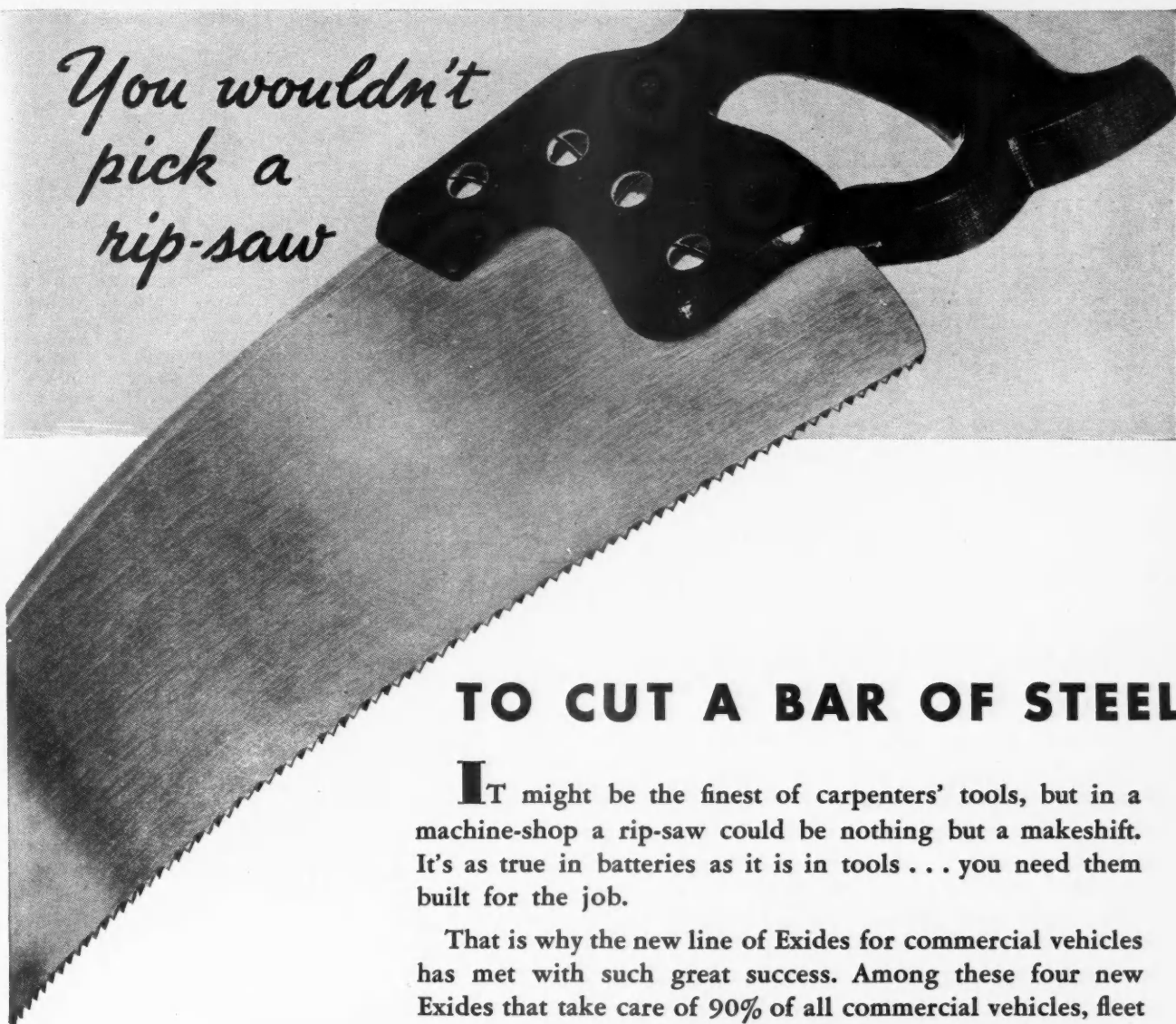
GAR WOOD'S tree-moving crane unit provides landscape gardeners and nurseries with modern, time and labor-saving equipment for moving and transplanting big trees. This new unit, production of which was announced recently by the Mead-Morrison division of Gar Wood Industries, Inc., Detroit, is capable of handling a 45-ft. tree which, with the ball of earth around the roots, weighs approximately 18,000 lb.

[More Products Page 46]

Tree moving crane unit



*You wouldn't
pick a
rip-saw*



TO CUT A BAR OF STEEL

IT might be the finest of carpenters' tools, but in a machine-shop a rip-saw could be nothing but a makeshift. It's as true in batteries as it is in tools . . . you need them built for the job.

That is why the new line of Exides for commercial vehicles has met with such great success. Among these four new Exides that take care of 90% of all commercial vehicles, fleet operators have found batteries that exactly meet their needs . . . built for long life in the toughest kind of fleet service.

Others, operating large trucks, know from long experience that the Exide heavy-duty line is equally complete and that the batteries in it set the standards of long life, dependability and economy in their field. If you haven't done so already, write us for the name of the nearest Exide Wholesaler, who will give you full details.



THE ELECTRIC STORAGE BATTERY CO., Philadelphia
The World's Largest Manufacturers of Storage Batteries for Every Purpose
Exide Batteries of Canada, Limited, Toronto

Exide

**COMMERCIAL TYPE BATTERIES
WITH MIPOR AND SLOTTED RUBBER**

"MIPOR," Reg. U. S. Pat. Off.

COMMERCIAL CAR JOURNAL
JUNE, 1937

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News

SUMMARY

April Best Month In Truck History

April truck production and sales are the highest for any month in truck history.

New truck registrations for April, 1937, are estimated at 70,000 units based on re-

turns from 37 states. This is an increase of 16 per cent over March with 60,291 units and an 8 per cent increase over April, 1936, when 64,957 units were sold. Registrations for the first four months of 1937 totaled 219,715 which is 9 per cent over the registrations for the same period in 1936.

April truck production reached an all-time high with 100,508 units which was an increase of 5 per cent over March when 95,785 units were produced and an increase of 11 per cent over April, 1936, when 90,346 units were produced. Production for the first four months of 1937 totaled 343,928 units which is a 12 per cent increase of production for the corresponding period last year when 306,569 units were produced.



M. E. Clark, who has been appointed sales manager of Randall Graphite Products Corp., Chicago. He was formerly with the Bunting Brass and Bronze Co. in an engineering capacity.



G. W. Waine Thomas, who has been appointed chief engineer for the Reo Motor Car Co., of Lansing, Mich. He has been with Reo for the past 11 years in an engineering capacity.

THE FIRST CENSUS of the trailer industry just completed by the U. S. Bureau of the Census, shows that 2519 four-wheel truck trailers valued at \$2,296,444, and 23,875 semi-trailers, valued at \$15,848,150, were sold by 144 U. S. factories in 1936. Nineteen factories in Michigan and Ohio sold 12,487 of the 26,394 units.

APPOINTMENTS

EASTON CAR & CONSTRUCTION CO., Easton, Pa., has appointed Charles Abeles to the sales staff with headquarters in the New York office.

TIMKEN-DETROIT AXLE CO., Detroit, has appointed Charles A. Cooper assistant secretary and assistant treasurer in charge of credits for the company.

INTERNATIONAL HARVESTER CO. has named B. M. Kaiser assistant branch manager at the company's Cincinnati office. G. C. GRIDLEY has been elected vice-president and works manager of the Mechanics Universal Joint Division of the Borg-Warner Corp., Chicago.

HOMESTEAD VALVE MFG. CO., Coraopolis, Pa., has appointed as distributor of its products the Warren Bruce & Co., St. Louis, and Proctor Engineering Co., Baltimore.

STUDEBAKER has appointed T. W. Nevin as district manager for Mexico, Central America and the Caribbean. A. L. Frank has been appointed president of the export corporation.

TRAILER CO. OF AMERICA, Cincinnati, has appointed A. J. Woltering executive vice-president of all operations. C. H. Kinney replaces Mr. Woltering as sales manager.

DEFIANCE PRESSED STEEL CO., Toledo, has appointed W. H. Bretzlaff as vice-president.

TRUCK EQUIPMENT CO., Buffalo, has appointed the following men to its sales staff: R. F. Sutton, Philadelphia district manager; W. Antrim, Chicago district representative; D. Vandercook, Chicago district representative.

[Washington Letter on Page 122; Additional News on Page 44]

Same-Day HOOF Service

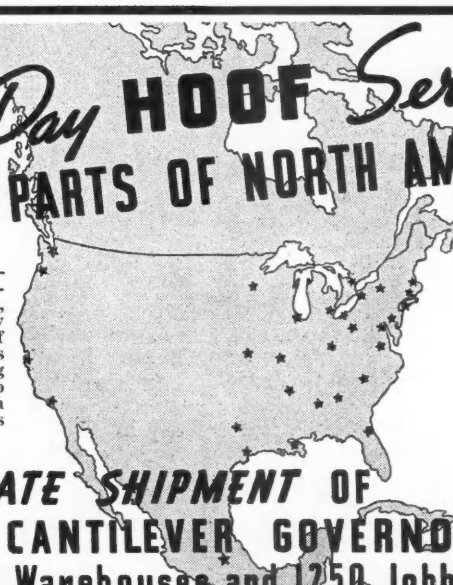
TO ALL PARTS OF NORTH AMERICA

Every star represents a HOOF warehouse. In addition, 1250 jobbers carry a complete line of HOOF Governors . . . guaranteeing same-day service to all parts of America where automobiles are used.

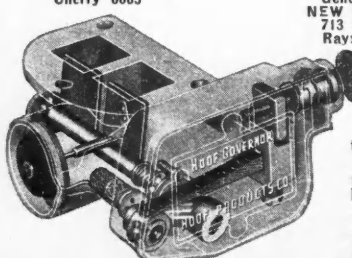
IMMEDIATE SHIPMENT OF

HOOF CANTILEVER GOVERNORS

from 30 Warehouses and 1250 Jobbers



ATLANTA, GA. 279 Ivy St., Walnut 1919 BALTIMORE, MD. 1126 Cathedral St., Vernon 2707 BIRMINGHAM, Ala. 208 S. 22nd St., Tel. 3-5022 BOSTON, MASS. 4 Maitland St., Kenmore 5578 BUFFALO, N. Y. 779 Michigan St., Cleveland 8027 CHARLOTTE, N. C. 230 N. College St., Tel. 2654 CHICAGO, ILL. 160 N. Franklin St., Central 4135 CINCINNATI, OHIO 717 Sycamore St., Cherry 1282 CLEVELAND, OHIO 1250 Ontario St., Cherry 0605	DALLAS, TEXAS. 1905 Canton St., Tel. 7-6461 DETROIT, MICH. 4809 John R St., Columbia 4530 HARTFORD, CONN. 331 Church St., Tel. 74567 HOUSTON, TEXAS. 1405 San Jacinto St., Capital 6054 JACKSONVILLE, FLA. 23 E. Beaver St., Tel. 5-1121 KANSAS CITY, MO. 1910 Grand Ave., Victor 0367 LOS ANGELES, CALIF. 1358 S. Flower St., Prospect 8111 MEMPHIS, TENN. 239 Washington Ave., Tel. 8-1442 MINNEAPOLIS, MINN. 1316 1/2 Harmon Place, Geneva 0234 NEW ORLEANS, LA. 713 St. Joseph St., Raymond 9976	NEW YORK, N. Y. 33 West 60th St., Columbus 5-0544 PHILADELPHIA, PA. 1839 Wylie St., Fremont 2813 PITTSBURGH, PA. 510 S. Graham St., Schenley 7441 PORTLAND, OREGON 408 N. W. 12th Ave., Broadway 6513 RICHMOND, VA. 1813 W. Broad St., Tel. 51549 ST. LOUIS, MO. 3150 Locust Bl'vd., Jefferson 3222 SAN FRANCISCO, CALIF. 528 Larkin St., Franklin 1782 SEATTLE, WASH. 1428 Harvard Ave., East 4344 SYRACUSE, N. Y. 310 W. Taylor St., Syracuse 3-8184 TORONTO 5, CANADA 18 Broadbalt St., Midway 3539
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HOOF Cantilever Spring Governors come in three advanced types: (1) The HOOF "Key-type" Governor, whose speed can be changed only by person having key; (2) A.C.H. "Seal-Type" Governors . . . protected by the tamper-proof HOOF seal; and (3) the HOOF "Dash-Control" Governor, whose speed can be changed from the dash only by holder of key.

Write for HOOF'S 64-page GOVERNOR MANUAL and SUPPLEMENT . . . which is FREE.

Phantom View, HOOF Dual Key-Type Governor

HOOF PRODUCTS COMPANY

162 NO. FRANKLIN STREET CHICAGO ILLINOIS

Cantilever Governors

SETS NEW INDIANAPOLIS STOCK-CAR RECORD WITH GULF



RALPH DE PALMA, veteran 55-year-old racing driver, who dramatically proved No-Nox Ethyl's knockproof power, and Gulfpride Oil's remarkable staying qualities, at the Indianapolis Speedway!

Using Gulf No-Nox Ethyl and Gulfpride Oil, Ralph De Palma beats track stock-car record by 4.19 M.P.H. in 500-mile grind

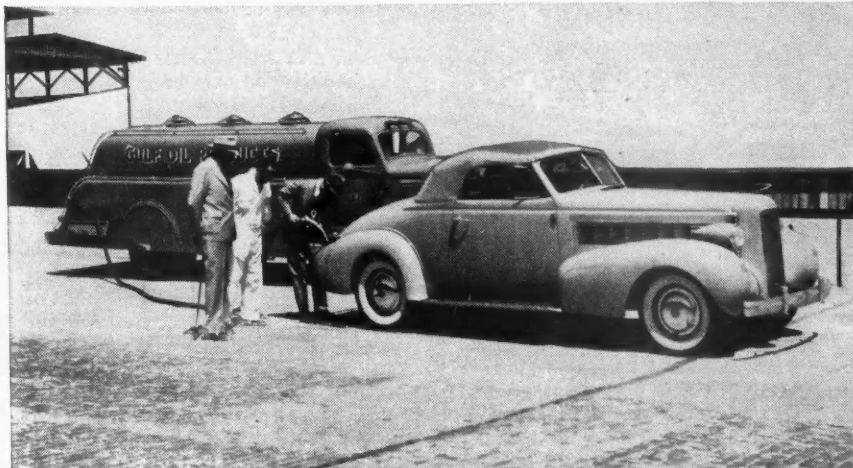
"JUST a nice day's drive," said the veteran racing driver, after chalking up an 82.19 M. P. H. average while trying out the first-lap pacemaker for this year's Indianapolis Race.

His stock La Salle averaged 4.19 M.P.H. better than the previous stock car record for this distance on the Indianapolis speedway, and 7.60 M. P. H. better than the winner of the first Indianapolis race in 1911. His last lap was made at an average speed of 88.556 M. P. H.

Gulf's new No-Nox Ethyl develops peak power, and is absolutely *knockproof*—even in new 1937 high compression motors at top speed.

And Gulfpride Oil's amazing staying power was proved by the fact that *only about one quart was used up in the entire 500 miles of fast driving.*

These same two great products—finest in the field—are available only at the Sign of the Orange Disc.



CONTEST BOARD OF THE A.A.A. certified the fueling of the car with Gulf No-Nox Ethyl and the use of Gulfpride Oil, procured from regular consumer outlets under Official Sanction No. 3516.



THE FINISH—500 grueling miles at 82.19 M. P. H. And *only about one quart of Gulfpride used up!* The identical oil is sold at the Gulf Orange Disc.

GULF PETROLEUM PRODUCTS

GULF OIL CORPORATION

GULF REFINING COMPANY



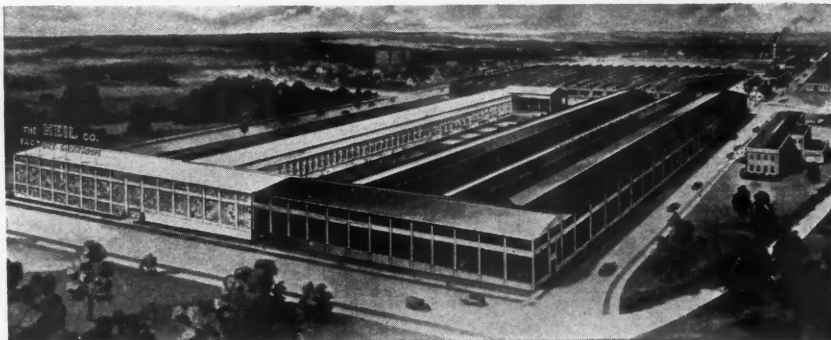
NEWS

(CONTINUED FROM PAGE 42)

FEDERAL MOTOR TRUCK has appointed J. F. Maxwell as service manager. B. F. GOODRICH, Akron, has elected S. B. Robertson as president of the company. GENERAL MOTORS CORP. elected M. E. Coyle a director of the company.

SALES

WHITE MOTOR CO. deliveries in the first four months of this year were higher than they have been in any similar period for the past 11 years. Deliveries of White and Indiana trucks in April totaled 1301 units, the greatest number in any similar month



An addition of considerable size has been added to the manufacturing plant of the Heil Co., Milwaukee, Wis. The new addition was necessitated by the increased demand for Heil products

SAVES MONEY 9 WAYS EARNS MONEY 2 WAYS *and Costs Less to begin with*

● You may take it for a fact that if you haul 5 tons or more

TRUXMORE

will save money and make money for you. The proof of this statement, partly an engineering explanation, partly the evidence of hundreds of TRUXMORE users is too long to be detailed in this advertisement, but not too long or too complicated for you to perceive easily from literature we'll gladly send you.

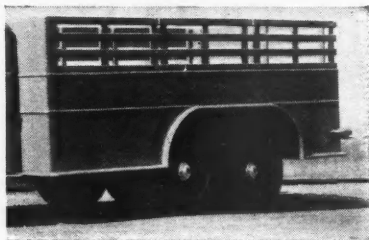
9 WAYS TRUXMORE SAVES MONEY

Saves Gas
Saves Oil
Saves Tires
Saves Maintenance

Saves Insurance
Saves Taxes
Saves Depreciation
Saves Breakage
Saves Accidents

One TRUXMORE user calculates his savings at \$12 PER ROUND TRIP for each truck. Can any company afford *not* to investigate such an addition to its profits? The largest users of TRUXMORE are the fleets of companies that keep accurate cost records such as Shell,

Tide Water, Sinclair, Armour, Swift and others in your industry.



2 WAYS TRUXMORE EARNS MONEY

Carries Bigger Payload
Carries More Payload miles per day
and TRUXMORE
Costs Less to Begin With

Returning this coupon is the first step toward making these savings for your company. Mail it today!

BRANCHES AND DISTRIBUTORS IN PRINCIPAL CITIES

TRUCK EQUIPMENT CO., INC., Dept. A, Buffalo, N. Y.

You've made some strong statements. Can you prove them?

Name Position
Company
Address

since 1926, and in the first four months deliveries amounted to 4219 units as compared with 3305 in the same period last year. This is also a record for any comparable period since 1926.

JOIN CHILTON STAFF

JAMES U. STEINFIRST, formerly financial writer on the New York Journal of Commerce, has been appointed news editor of *Automotive Industries*. Leslie Peat, former managing editor of *Automotive Industries*, has been named *AI* editorial representative in New York.

EXPANSIONS

AUTOCAR CO., Ardmore, Pa., has opened a new branch in Hagerstown, Md., at 1017 W. Washington St. J. M. MacHale has been appointed manager.

CENTURY ELECTRIC CO. has moved its New York offices to larger quarters at 30 Vesey St., N. Y. C.

B&J TRAILER CO. announces that it has opened its first factory branch in Milwaukee, Wis., at 1538 W. National Ave.

H. S. WATSON CO. has increased its office facilities and now occupies the entire building at 1145 Harrison St., San Francisco. The expansion was necessitated by increased demand for Watson-Brown-Lipe auxiliary transmissions.

THOMPSON PRODUCTS CO., Cleveland, has acquired the assets and business of the Jadson Motor Products Co., Bell, Calif. EXPANSION of the manufacturing operations in the Brown-Lipe-Chapin plant of the GM guide lamp division at Syracuse, has been announced.

EFFECTIVE June 1 warehouse stocks of Edison Spark Plugs will be established in San Francisco and Portland, Ore. This step follows closely the appointment of Robert H. Deibler as the company's Pacific Coast representative.

OBITUARIES

CHARLES N. TEETOR, chairman of the board of directors and president of the Perfect Circle Co., died at his home Sunday, May 2.

R. M. HENRICH, vice-president, director and general manager of the Bendix-Westinghouse Automotive Air Brake Co., died May 18 following a brief illness.

(TURN TO PAGE 127, PLEASE)

When writing to advertisers please mention *Commercial Car Journal*

COMMERCIAL CAR JOURNAL
JUNE, 1937

1400-GALLON "TAXI" HAULS GOLDFISH

A TRUE "FISH STORY"

By LOWELL THOMAS

"Talk about strange cargoes. Listen to this true 'fish story.' Out in Martinsville, Ind., is the world's largest goldfish hatchery. The principal market, New York City, is a thousand miles away. To make this jump the Grassyfork Fisheries built a special tank truck, a ten-tire giant that can haul 200,000 fish in one load.

"To protect this precious shipment, the truck is heavily insulated. A special engine drives a compressor, forces a constant stream of air through the 1400 gallons of water.

CAN'T TAKE CHANCES

"Once a week in zero-weather January or broiling July this big truck makes the eastward journey. Carries fish for the East, rare specimens to go aboard Atlantic liners. They must 'bring 'em in alive.' Delays would be costly. You can't take chances on tire failure with a job like this.

"But they tell me they just don't have tire trouble with

Goodrich Triple Protected Silvertowns. Not one sidewall failure! And they run up tremendous mileages.

"In all my travels I've noticed that on the toughest trucking jobs you usually find Goodrich Silvertowns."

Lowell Thomas is right! Where the going is hardest Goodrich is first choice. Goodrich Tires are being tortured in heavy forests under crushing log loads of 15 and 20 tons, through burning deserts on fast schedules at 130° temperatures—over jagged rock in coal mine operations—in the army through ditches and underbrush, on no road at all! And they take this punishment in their stride.



Goodrich Silvertowns are Triple Protected in the sidewall—built with an invention that checks 80% of all premature failures. Only Goodrich gives you this 3-way safeguard:

- 1 PLYFLEX—distributes stresses throughout the tire—prevents ply separation—checks local weakness.
- 2 PLY-LOCK—protects the tire from breaks caused by short plies tearing loose above the bead.

- 3 100% FULL-FLOATING CORD—eliminates cross cords from all plies—reduces heat in the tire 12%.

On your trucks, too, you can get a new freedom from road delays and big repair bills and at the same time increase mileage with Triple Protected Silvertowns. See the Goodrich dealer and start saving. Or write The B. F. Goodrich Co., Akron, Ohio and Los Angeles, Calif.

Goodrich Triple Protected Silvertowns

SPECIFY THESE NEW SILVERTOWN TIRES FOR TRUCKS AND BUSES

COMMERCIAL CAR JOURNAL
June, 1937

When writing to advertisers please mention Commercial Car Journal

New Products ON PARADE

Latex Upholstery

LATEX mattress material has just been announced by The Goodyear Tire & Rubber Co., Akron. Similar to sponge rubber, the new product is made from latex to which innumerable air bubbles have been introduced. All the "life" of the

rubber molecules is retained with a resulting high degree of resilience and resistance to wear.

Molded in one piece, this material is porous, dustless, odorless, durable, light in weight, antiseptic, washable, has no lumps, etc., and is a durable form of upholstery for trucks.

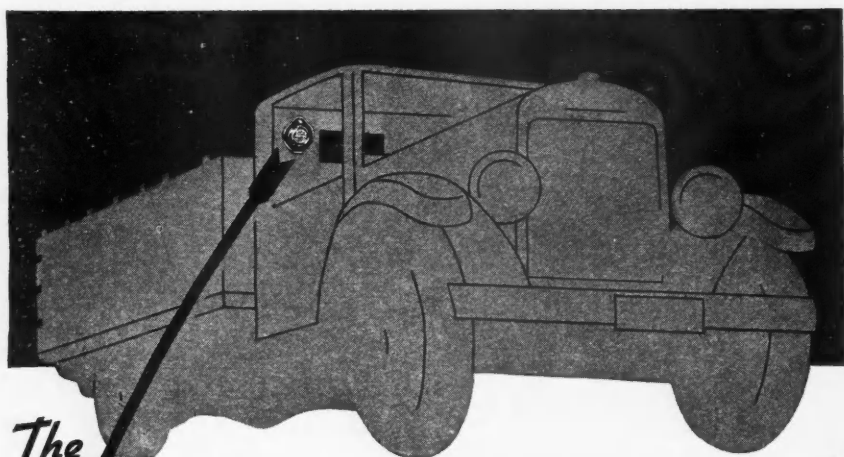
Hansen Catalog

MANY new items have been added to the line of commercial body hardware as shown in the new catalog issued by the A. L. Hansen Mfg. Co., 5047 Ravenswood Ave., Chicago. Among these are a trigger-action lock, balanced-lift window regulator, locking device for refrigerator doors,

continuous hinge, flush handles, etc. The back section of the catalog contains tacking and stapling machines for industrial tacking. These latter items have gradually expanded into many models for numerous applications. The catalog cover is very attractive, being die-embossed in gold and black on a rich stipple leather-effect brown. It is more than twice the size of this company's previous catalog.

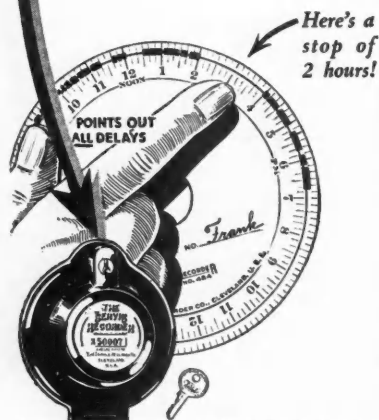
Pneumatic Valve Grinder

ALDON PRODUCTS CO., 2050 High St., Duncannon, Pa., has a pneumatic valve grinder for hard and soft seats which features high adjustable speeds ranging from 600 to 6000 strokes per minute obtainable



The SPOT of CONTROL!

*This Little Device
Tells You When
Truck Was Working
and When It
Was Standing Idle
... All Day Long!*



A "pound and a half of management," you might call it—YOUR representative on the truck, and on all the other trucks which you own and operate.

Many things combine to waste a truck's time, but they all show up on the clock-driven chart of the Servis Recorder. And, by the way, why should anyone operate trucks without this simple device, which *lays on your desk* a complete "picture" of the very facts you must have before you can even begin to intelligently control your motor trucks.

Small—easy to install—attached in two minutes time to any truck by a couple of screws or bolts; you could even nail it on and it would work. (Not attached to hub or running gear.) Strong and sturdy—will outlast the truck.

Write for booklet—*Ten Ways of Getting More Work Out of Motor Trucks*. It's FREE.

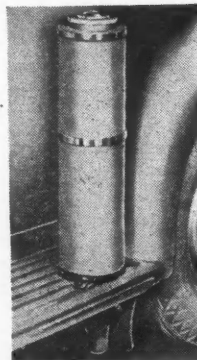
THE SERVICE RECORDER CO.
1422 Euclid Avenue • Cleveland, Ohio

The Servis Recorder
Tells Every Move Your Truck Makes



simply by turning an adjusting screw. Its action is roto-oscillating and as the valve is oscillated back and forth it automatically moves forward 1/6 of a revolution at each stroke. It is light in weight, only 28 oz. Wearing parts are reduced to a minimum and there is not a single cam or gear in the driving mechanism. Price of the unit is \$12.75.

Lintern Sander



THE new Lintern sander is distinctive, and attractive in design and will fit on practically any make of passenger car or light delivery truck.

The hoppers rest on each running board and are made of rust-proofed steel and given a prime coat so that the purchaser may finish them to match color. They stand 27 1/2 inches high and have an outside diameter of 5 inches.

These hoppers hold 45 to 50 pounds of sand each. They are fastened securely to the running board with three stud bolts. The mounting is simplified by a mounting ring which allows the cylinder to be (TURN TO PAGE 48, PLEASE)

*As easy to refill
as stuffing waste
in your
pocket!*



ONE OF MANY ADVANTAGES OF DUO-FLO (DEPTH TYPE) OIL FILTERS

● You can replace used "Wastex" with a fresh supply by simply removing the perforated washers at either end of the Duo-Flo filter element . . . Just a few minutes' work.

Duo-Flo is really two filters in one—a depth type filter of high efficiency and a greater capacity proved by thousands of applications and approved by leading engine, bus, truck and commercial vehicle builders.

Because of the extra mileage, more thorough filtering—and ease of servicing—you, too, can cut oil costs, save engine wear, save servicing time with Duo-Flo Filters.

Send for new Bulletin 337-C today. MICHIANA PRODUCTS CORP., Michigan City, Ind.

MICHIANA

Duo-Flo

DEPTH TYPE FILTERS



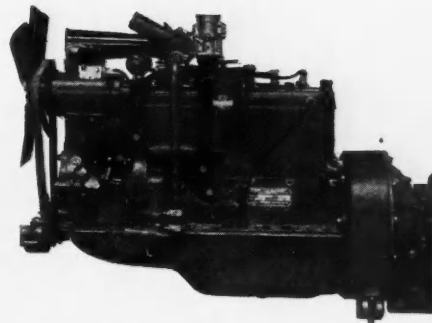
Write for our Bulletin 337-C which explains fully the Duo-Flo filtering principle.

In this type Michiana Duo-Flo Filter, the Duo-Flo element is in a sealed cartridge.



Above: Practical, economical—the Duo-Flo filter element is so easy to refill with "Wastex".

The Duo-Flo Element can be used in your H-W Filter—as shown in cut-away view.



Michiana Duo-Flo Oil Filtering principle has proven its economy and efficiency on thousands of motors.

COMMERCIAL CAR JOURNAL
JUNE, 1937

When writing to advertisers please mention Commercial Car Journal

(CONTINUED FROM PAGE 46)
turned so that the nozzle, attached at a point slightly off center, can be easily directed exactly in front of the wheel. The sander valve, mounted inside each hopper, is operated by a control on the steering post. This control has a toggle switch so that the driver may operate the sander by finger lever at the wheel or by brake foot pedal, as desired. Lintern Corp., 7960 Lorain Ave., Cleveland.

Tire Regroover

A NEW tire regroover has been announced by Joseph Mertens, 2315 Spring St., Racine, Wis. Improves the appearance of used tires and is very valuable to the car dealer

for the resale of used cars. Easy to operate, this electric controlled gun regroover is supplied complete with 12 adjustable diamond steel blades at a list price of \$9.

Hydrau-Kit

A SPECIAL hydraulic jack for straightening out the bent bodies and fenders, and for all other operations requiring pressing, bending, pulling, and pushing in connection with motor car repair work, is announced by the American Grinder and Specialty Corp., Milwaukee, Wis. The "Hydrau-Kit" is the name of this new jack designed for repair work, and the complete kit includes the hydraulic power unit and 26 attachments packed in a

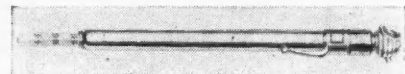


strong metal box measuring 18 x 7 x 7 in. The lifting capacity of the power unit is 4000 lb. and the extra attachments are designed to enable the operator to apply this pressure to any part of the car which may need it.

The hydraulic unit in the Hydrau-Kit is oil powered and is so designed that none of the oil approaches any joints which open to the exterior of the device, thereby eliminating any possibility of seepage.

Tractor Tire Gauge

A NEW gauge has been developed by A. Schrader's Son, Brooklyn, N. Y., for ser-



viceing pneumatic tires on tractors. Calibrations range from the low pressure of 4 lb. up to 50 lb. in one pound graduations.

Electrode Holder

LINCOLN ELECTRIC CO., Cleveland, has designed the type T electrode holder. It is light in weight and has a powerful spring clamp that grips the electrode tightly. Copper-tipped jaws insure maximum conductivity. The type T holder accommodates any size electrode up to and including 1/4-in. and can be arranged to handle 1/8 and 3/8-in. electrodes. A hollow fibre handle fits the operator's hand and stays cool at all times.

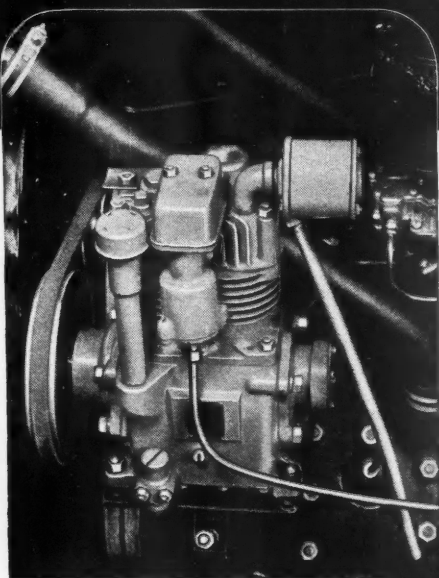
Ford Conversion

TRANSPORTATION ENGINEERS, INC., Detroit, Mich., are rebuilding the Ford 60 h.p., 112 in. chassis so that the driver is located 24 in. further forward. This makes the chassis available for an integral cab and body of camel-back design. It is primarily for dry cleaners and milk delivery.

The steering gear is moved ahead and supported by a cast steel bracket on the frame. A newly perfected steering relay device makes it possible to connect up to the cross steering motion without change in geometry or ratio. This device is patented. The floor level is about 29 in. which permits the use of only one step. The assembly is offered with steering gear and all foot pedals mounted in the same relative position as in the original chassis.

HERE'S A FORD AIR BRAKE WITH PLENTY OF RESERVE POWER

IN CITY TRAFFIC YOU
NEED MIDLAND'S BIG
7.3 C. F. COMPRESSOR



Midland 7.3 Cu. Ft. Compressor,
mounted on a 1937 Ford V-8.

COMPLETE KITS

All necessary parts, plus complete instructions, are contained in handy packaged kits—for 1937 Fords. Also vacuum kits for all popular makes. See any of Midland's nation-wide network of distributors or write direct.

• With Midland (Christensen) air brakes on your Ford tractors or trucks, you have ample reserve air pressure. In city traffic, on hilly roads—wherever brakes are used most, operators can depend on Midland's extra margin of safety. The Midland compensating foot control valve releases any amount of air pressure desired—you can check speed gradually or come to a quick-acting emergency stop.

MIDLAND FORD AIR BRAKES
AS LOW AS

\$139.00

DISTRIBUTORS WANTED

Write us about our distributor franchise.
Your territory may be available.

THE MIDLAND STEEL PRODUCTS CO.
10605 MADISON AVENUE • CLEVELAND, OHIO



MIDLAND
(CHRISTENSEN)
Power Brakes



Line Number	MAKE MODEL	GENERAL (See Keynote)			TIRE SIZES		ENGINE DETAILS										TRANSMISSION		REAR AXLE		FRONT AXLE	BRAKES				C-A Dimension (Std. W.B.)	FRAME				
		Rating	Chassis Price	Standard Wheelbase	Standard Front and Rear	Dual rear Single rear	No. of Cylinders	Stroke	Displacement	Comp. Ratio	Torque lb. ft.	Max. Brake H.P. at R.P.M.	Number, Diameter	Main Bearings	Governor Standard	Make and Model	Model	Make and Model	Gear and Type	Drive & Torque		Range in High	Make and Model	Location	Operator			Limit	Area	Drum	Drum
1	Autocar	(D) A	1095	136	179	13500	4790	6.50/20D	8.25/20	Her JXB	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
2		(B)	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
3		(C) A	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
4		(C) B	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
5		(C) C	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
6		(C) D	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
7		(C) E	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
8		(C) F	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
9		(C) G	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
10		(C) H	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
11		(C) I	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
12		(C) J	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
13		(C) K	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
14		(C) L	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
15		(C) M	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
16		(C) N	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
17		(C) O	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
18		(C) P	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
19		(C) Q	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
20		(C) R	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
21		(C) S	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
22		(C) T	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
23		(C) U	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
24		(C) V	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
25		(C) W	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
26		(C) X	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
27		(C) Y	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
28		(C) Z	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
29		(C) AA	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
30		(C) AB	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
31		(C) AC	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
32		(C) AD	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
33		(C) AE	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
34		(C) AF	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
35		(C) AG	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
36		(C) AH	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
37		(C) AI	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
38		(C) AJ	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/2	7 1/2 x 3 1/2
39		(C) AK	1480	139	179	13500	4790	6.50/20D	8.25/20	Her JXC	6-3 1/2 x 4 1/2	263 1/2	5.8	164	73-2800	7-3 1/2 x 10 1/2	Y	Cla 1835 F	4	54412	2F	H	** 6-8	Tim 31007	LAHV	308	470	0	TD	69 1/	

[illegible]

Line Number	MAKE AND MODEL	GENERAL (See Keynote)				TIRE SIZES		ENGINE DETAILS										TRANSMISSION		REAR AXLE		FRONT AXLE	BRAKES				C-A Dimension (Std. W. B.)	Side Rail Dimensions	Type																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																			
		Tonnage Rating	Chassis Price	Standard Wheelbase	Max. W. B.	Gross Vehicle Weight with Max. Tires	Chassis Wt. (Stripped)	Standard Front and Rear	Dual rear S-Single rear	No. of Cylinders	Stroke	Displacement	Comp. Ratio	Max. Brake H.P. at R.P.M.	Main Bearings Number, Length and Governor Standard	Make and Model	Forward Spd's	Make and Model	Clear and Type	Drive & Torque	Gear Ratio		Make and Model	Location	Lining Area	Drum Area				Drum Material	Hand Location																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
1	Fageol	100BK 1 1/2-2 1/2	1275	156	169	12500	4400	6.50/20D	7.50/20	Wau 6BK	6-34x44	282	5.1	190	7-3/4x10 1/2	WG T9	4	Tim 3000H	BF	H	4.56-9	LAIH	350	272	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578	578

Model	Year	Price	MPG	Engine	Transmission	Drivetrain	Options	Notes
84	1970	10,500	18	1.6	4	F	...	
85	1971	11,000	18	1.6	4	F	...	
86	1972	11,500	18	1.6	4	F	...	
87	1973	12,000	18	1.6	4	F	...	
88	1974	12,500	18	1.6	4	F	...	
89	1975	13,000	18	1.6	4	F	...	
90	1976	13,500	18	1.6	4	F	...	
91	1977	14,000	18	1.6	4	F	...	
92	1978	14,500	18	1.6	4	F	...	
93	1979	15,000	18	1.6	4	F	...	
94	1980	15,500	18	1.6	4	F	...	
95	1981	16,000	18	1.6	4	F	...	
96	1982	16,500	18	1.6	4	F	...	
97	1983	17,000	18	1.6	4	F	...	
98	1984	17,500	18	1.6	4	F	...	
99	1985	18,000	18	1.6	4	F	...	
100	1986	18,500	18	1.6	4	F	...	
101	1987	19,000	18	1.6	4	F	...	
102	1988	19,500	18	1.6	4	F	...	
103	1989	20,000	18	1.6	4	F	...	
104	1990	20,500	18	1.6	4	F	...	
105	1991	21,000	18	1.6	4	F	...	
106	1992	21,500	18	1.6	4	F	...	
107	1993	22,000	18	1.6	4	F	...	
108	1994	22,500	18	1.6	4	F	...	
109	1995	23,000	18	1.6	4	F	...	
110	1996	23,500	18	1.6	4	F	...	
111	1997	24,000	18	1.6	4	F	...	
112	1998	24,500	18	1.6	4	F	...	
113	1999	25,000	18	1.6	4	F	...	
114	2000	25,500	18	1.6	4	F	...	
115	2001	26,000	18	1.6	4	F	...	
116	2002	26,500	18	1.6	4	F	...	
117	2003	27,000	18	1.6	4	F	...	
118	2004	27,500	18	1.6	4	F	...	
119	2005	28,000	18	1.6	4	F	...	
120	2006	28,500	18	1.6	4	F	...	
121	2007	29,000	18	1.6	4	F	...	
122	2008	29,500	18	1.6	4	F	...	
123	2009	30,000	18	1.6	4	F	...	
124	2010	30,500	18	1.6	4	F	...	
125	2011	31,000	18	1.6	4	F	...	
126	2012	31,500	18	1.6	4	F	...	
127	2013	32,000	18	1.6	4	F	...	
128	2014	32,500	18	1.6	4	F	...	
129	2015	33,000	18	1.6	4	F	...	
130	2016	33,500	18	1.6	4	F	...	
131	2017	34,000	18	1.6	4	F	...	
132	2018	34,500	18	1.6	4	F	...	
133	2019	35,000	18	1.6	4	F	...	
134	2020	35,500	18	1.6	4	F	...	
135	2021	36,000	18	1.6	4	F	...	
136	2022	36,500	18	1.6	4	F	...	
137	2023	37,000	18	1.6	4	F	...	
138	2024	37,500	18	1.6	4	F	...	
139	2025	38,000	18	1.6	4	F	...	
140	2026	38,500	18	1.6	4	F	...	
141	2027	39,000	18	1.6	4	F	...	
142	2028	39,500	18	1.6	4	F	...	
143	2029	40,000	18	1.6	4	F	...	
144	2030	40,500	18	1.6	4	F	...	
145	2031	41,000	18	1.6	4	F	...	
146	2032	41,500	18	1.6	4	F	...	
147	2033	42,000	18	1.6	4	F	...	
148	2034	42,500	18	1.6	4	F	...	
149	2035	43,000	18	1.6	4	F	...	
150	2036	43,500	18	1.6	4	F	...	
151	2037	44,000	18	1.6	4	F	...	
152	2038	44,500	18	1.6	4	F	...	
153	2039	45,000	18	1.6	4	F	...	
154	2040	45,500	18	1.6	4	F	...	
155	2041	46,000	18	1.6	4	F	...	
156	2042	46,500	18	1.6	4	F	...	
157	2043	47,000	18	1.6	4	F	...	
158	2044	47,500	18	1.6	4	F	...	
159	2045	48,000	18	1.6	4	F	...	
160	2046	48,500	18	1.6	4	F	...	
161	2047	49,000	18	1.6	4	F	...	
162	2048	49,500	18	1.6	4	F	...	
163	2049	50,000	18	1.6	4	F	...	
164	2050	50,500	18	1.6	4	F	...	
165	2051	51,000	18	1.6	4	F	...	
166	2052	51,500	18	1.6	4	F	...	
167	2053	52,000	18	1.6	4	F	...	
168	2054	52,500	18	1.6	4	F	...	
169	2055	53,000	18	1.6	4	F	...	
170	2056	53,500	18	1.6	4	F	...	
171	2057	54,000	18	1.6	4	F	...	
172	2058	54,500	18	1.6	4	F	...	
173	2059	55,000	18	1.6	4	F	...	
174	2060	55,500	18	1.6	4	F	...	
175	2061	56,000	18	1.6	4	F	...	
176	2062	56,500	18	1.6	4	F	...	
177	2063	57,000	18	1.6	4	F	...	
178	2064	57,500	18	1.6	4	F	...	
179	2065	58,000	18	1.6	4	F	...	

† Denotes New Models or Change in Specifications.

Line Number	MAKE MODEL	GENERAL			TIRE SIZES		ENGINE DETAILS							TRANS- MISSION		REAR AXLE			FRONT AXLE	BRAKES			C-A Dimensions (Std. W. B.)	FRAME																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																										
		Rating	Tonnage	Chassis Wt. (Stipped)	Standard Front and Rear	D-dual rear S-single rear	Make and Model	No. of Cylinders, Bore and Stroke	Displacement	Torque lb. ft.	H.P. at R.P.M.	Main Diameter and Length	Governor Standard	Make and Model	Gear and Type	Drive & Torque	Gear Ratio	Make and Model		Location	Type	Drum Area			Drum Material	Hand Location																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																								
																											Price	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight	Weight

Rear 32 x 6.

ear 6.50/20

8.25/20

5 Rear :

10

1937

1937

Line Number	MAKE MODEL	GENERAL (See Keynote)			TIRE SIZES		ENGINE DETAILS							TRANS-MISSION		REAR AXLE			FRONT AXLE	BRAKES					FRAME				
		Chassis Price	Standard Wheelbase	Max. W. B.	Gross Vehicle Wt. (Stripped)	D-dual rear S-singlr rear	Max. Tire Size	No. of Cylinders	Stroke	Displacement	Comp. Ratio	Torque lb. ft.	H.P. at R.P.M.	Main Bearings	Governor Standard	Make and Model	Forward Spd's	Make and Model		Gear and Type	Range Ratio	Make and Model	SERVICE			C-A Dimension (Std. W. B.)	Side Rail Dimensions	Type	
																							Make	Location					Operat'n
1	White (Com't.)	5200	168 214	9205	9.00/20D	10.50/20	6-4 x 5 1/2	434	5.0	9365	116-2400	7-3 x 13 1/8	Y	Own 4B	4	Own 10C	SE	5.22-7.14	Own 9D	OAHV	591	832	a	92 1/2	8 1/2 x 3 1/2	L			
2	630K	6100	180 214	10185	9.00/20D	10.50/20	6-4 x 5 1/2	580	4.6	8385	130-2300	7-3 x 15 1/8	Y	Own 10B	4	Own 10C	SE	5.22-6.29	Own 9D	OAHV	591	832	a	107 1/2	8 1/2 x 3 1/2	L			
3	640	6300	180 214	10940	9.00/20D	10.50/20	6-4 x 5 1/2	580	4.6	8385	130-2300	7-3 x 15 1/8	Y	Own 10B	4	Own 10C	SE	5.22-6.29	Own 9D	OAHV	591	832	a	107 1/2	8 1/2 x 3 1/2	L			
4	640S	6100	180 214	10940	9.00/20D	10.50/20	6-4 x 5 1/2	580	4.6	8385	130-2300	7-3 x 15 1/8	Y	Own 10B	4	Own 10C	SE	5.22-6.29	Own 9D	OAHV	591	832	a	107 1/2	8 1/2 x 3 1/2	L			
5	720	4350	134 172	8200	9.00/20D	10.50/22	6-4 x 5 1/2	396	5.0	9370	116-2400	7-3 x 13 1/8	Y	Own 38B	4	Own 28C	SE	5.22-7.73	Own 24D	LAIHV	590	875	a	60	8 1/2 x 3 1/2	L			
6	720S	4350	134 172	8200	9.00/20D	10.50/22	6-4 x 5 1/2	396	5.0	9370	116-2400	7-3 x 13 1/8	Y	Own 38B	4	Own 28C	SE	5.22-7.73	Own 24D	LAIHV	590	875	a	60	8 1/2 x 3 1/2	L			
7	720S	4350	134 172	8200	9.00/20D	10.50/22	6-4 x 5 1/2	396	5.0	9370	116-2400	7-3 x 13 1/8	Y	Own 38B	4	Own 28C	SE	5.22-7.73	Own 24D	LAIHV	590	875	a	60	8 1/2 x 3 1/2	L			
8	720S	4350	134 172	8200	9.00/20D	10.50/22	6-4 x 5 1/2	396	5.0	9370	116-2400	7-3 x 13 1/8	Y	Own 38B	4	Own 28C	SE	5.22-7.73	Own 24D	LAIHV	590	875	a	60	8 1/2 x 3 1/2	L			
9	722X	5950	168 212	9745	9.75/20D	10.50/24	6-4 x 5 1/2	434	5.0	9365	116-2400	7-3 x 13 1/8	Y	Own 4B	4	Own 21C	SE	5.22-7.14	Own 9D	OAHV	633	996	a	100	8 1/2 x 3 1/2	L			
10	722X	5950	168 212	9745	9.75/20D	10.50/24	6-4 x 5 1/2	434	5.0	9365	116-2400	7-3 x 13 1/8	Y	Own 4B	4	Own 21C	SE	5.22-7.14	Own 9D	OAHV	633	996	a	100	8 1/2 x 3 1/2	L			
11	722X	5950	168 212	9745	9.75/20D	10.50/24	6-4 x 5 1/2	434	5.0	9365	116-2400	7-3 x 13 1/8	Y	Own 4B	4	Own 21C	SE	5.22-7.14	Own 9D	OAHV	633	996	a	100	8 1/2 x 3 1/2	L			
12	722X	5950	168 212	9745	9.75/20D	10.50/24	6-4 x 5 1/2	434	5.0	9365	116-2400	7-3 x 13 1/8	Y	Own 4B	4	Own 21C	SE	5.22-7.14	Own 9D	OAHV	633	996	a	100	8 1/2 x 3 1/2	L			
13	722X	5950	168 212	9745	9.75/20D	10.50/24	6-4 x 5 1/2	434	5.0	9365	116-2400	7-3 x 13 1/8	Y	Own 4B	4	Own 21C	SE	5.22-7.14	Own 9D	OAHV	633	996	a	100	8 1/2 x 3 1/2	L			
14	722X	5950	168 212	9745	9.75/20D	10.50/24	6-4 x 5 1/2	434	5.0	9365	116-2400	7-3 x 13 1/8	Y	Own 4B	4	Own 21C	SE	5.22-7.14	Own 9D	OAHV	633	996	a	100	8 1/2 x 3 1/2	L			
15	722X	5950	168 212	9745	9.75/20D	10.50/24	6-4 x 5 1/2	434	5.0	9365	116-2400	7-3 x 13 1/8	Y	Own 4B	4	Own 21C	SE	5.22-7.14	Own 9D	OAHV	633	996	a	100	8 1/2 x 3 1/2	L			
16	722X	5950	168 212	9745	9.75/20D	10.50/24	6-4 x 5 1/2	434	5.0	9365	116-2400	7-3 x 13 1/8	Y	Own 4B	4	Own 21C	SE	5.22-7.14	Own 9D	OAHV	633	996	a	100	8 1/2 x 3 1/2	L			
17	722X	5950	168 212	9745	9.75/20D	10.50/24	6-4 x 5 1/2	434	5.0	9365	116-2400	7-3 x 13 1/8	Y	Own 4B	4	Own 21C	SE	5.22-7.14	Own 9D	OAHV	633	996	a	100	8 1/2 x 3 1/2	L			
18	722X	5950	168 212	9745	9.75/20D	10.50/24	6-4 x 5 1/2	434	5.0	9365	116-2400	7-3 x 13 1/8	Y	Own 4B	4	Own 21C	SE	5.22-7.14	Own 9D	OAHV	633	996	a	100	8 1/2 x 3 1/2	L			
19	722A	5750	134 212	9800	10.50/20D	11.25/24	6-4 x 5 1/2	460	5.0	9320	128-2400	7-2 3/4 x 13 1/8	Y	Own 53B	5	Own 21C	2F	6.67-9.50	Own 6D	OAHV	632	1050	a	60	8 1/2 x 3 1/2	L			
20	722A	5750	134 212	9800	10.50/20D	11.25/24	6-4 x 5 1/2	460	5.0	9320	128-2400	7-2 3/4 x 13 1/8	Y	Own 53B	5	Own 21C	2F	6.67-9.50	Own 6D	OAHV	632	1050	a	60	8 1/2 x 3 1/2	L			
21	722A	5750	134 212	9800	10.50/20D	11.25/24	6-4 x 5 1/2	460	5.0	9320	128-2400	7-2 3/4 x 13 1/8	Y	Own 53B	5	Own 21C	2F	6.67-9.50	Own 6D	OAHV	632	1050	a	60	8 1/2 x 3 1/2	L			
22	722A	5750	134 212	9800	10.50/20D	11.25/24	6-4 x 5 1/2	460	5.0	9320	128-2400	7-2 3/4 x 13 1/8	Y	Own 53B	5	Own 21C	2F	6.67-9.50	Own 6D	OAHV	632	1050	a	60	8 1/2 x 3 1/2	L			
23	722A	5750	134 212	9800	10.50/20D	11.25/24	6-4 x 5 1/2	460	5.0	9320	128-2400	7-2 3/4 x 13 1/8	Y	Own 53B	5	Own 21C	2F	6.67-9.50	Own 6D	OAHV	632	1050	a	60	8 1/2 x 3 1/2	L			
24	722A	5750	134 212	9800	10.50/20D	11.25/24	6-4 x 5 1/2	460	5.0	9320	128-2400	7-2 3/4 x 13 1/8	Y	Own 53B	5	Own 21C	2F	6.67-9.50	Own 6D	OAHV	632	1050	a	60	8 1/2 x 3 1/2	L			
25	722A	5750	134 212	9800	10.50/20D	11.25/24	6-4 x 5 1/2	460	5.0	9320	128-2400	7-2 3/4 x 13 1/8	Y	Own 53B	5	Own 21C	2F	6.67-9.50	Own 6D	OAHV	632	1050	a	60	8 1/2 x 3 1/2	L			
26	722A	5750	134 212	9800	10.50/20D	11.25/24	6-4 x 5 1/2	460	5.0	9320	128-2400	7-2 3/4 x 13 1/8	Y	Own 53B	5	Own 21C	2F	6.67-9.50	Own 6D	OAHV	632	1050	a	60	8 1/2 x 3 1/2	L			
27	722A	5750	134 212	9800	10.50/20D	11.25/24	6-4 x 5 1/2	460	5.0	9320	128-2400	7-2 3/4 x 13 1/8	Y	Own 53B	5	Own 21C	2F	6.67-9.50	Own 6D	OAHV	632	1050	a	60	8 1/2 x 3 1/2	L			
28	722A	5750	134 212	9800	10.50/20D	11.25/24	6-4 x 5 1/2	460	5.0	9320	128-2400	7-2 3/4 x 13 1/8	Y	Own 53B	5	Own 21C	2F	6.67-9.50	Own 6D	OAHV	632	1050	a	60	8 1/2 x 3 1/2	L			
29	Auto-(1) 4x4 DF	5000	163 163	20000	8415	9.00/20D	9.00/20	6-4 x 4 1/4	404	5.5	9295	97-2200	7-3 x 14 1/8	Y	Own DF4	8	Tim 5002	2F	H **7.35	Tim F501	T4IMV	417	659	c	21	84 1/2	9 1/2 x 3 1/2	L	
30	car-(1) 4x4 N	6000	167 167	24000	9900	9.75/20D	9.75/20	6-4 x 4 1/4	404	5.5	9295	97-2200	7-3 x 14 1/8	Y	Own DF4	8	Tim 5002	2F	H **7.35	Tim F501	T4IMV	417	659	c	21	84 1/2	9 1/2 x 3 1/2	L	
31	car-(1) 4x4 S	7250	168 168	30000	11145	10.50/20D	10.50/20	6-4 x 4 1/4	453	5.5	9375	108-2200	7-3 x 14 1/8	Y	Own T14	8	Tim 1357	2F	H **7.52	Tim F313	T4IMV	639	975	c	21	89 1/2	10 1/2 x 3 1/2	L	
32	Clydesdale 80 (4x4) 2 1/2-4	***	170 190	18000	5900	7.75/20D	9.00/20	6-4 x 4 1/4	361	5.4	8252	96-2500	7-2 3/4 x 12 1/8	Y	Cla 270V	5	Wils 5002L	W/2	H Wils F551H	L4HV	335	782	A	CD	61	9 1/2 x 2 1/2	L		
33	105D (4x4) 2 1/2-3	***	170 190	23500	8700	7.75/20D	9.00/20	6-4 x 4 1/4	415	5.2	8054	105-2200	7-3 x 11 1/8	Y	Cla 270V	5	Wils 5002L	W/2	H Wils F551H	L4HV	335	782	A	CD	61	9 1/2 x 2 1/2	L		
34	105D (4x4) 2 1/2-3	***	170 190	23500	8700	7.75/20D	9.00/20	6-4 x 4 1/4	415	5.2	8054	105-2200	7-3 x 11 1/8	Y	Cla 270V	5	Wils 5002L	W/2	H Wils F551H	L4HV	335	782	A	CD	61	9 1/2 x 2 1/2	L		
35	105D (4x4) 2 1/2-3	***	170 190	23500	8700	7.75/20D	9.00/20	6-4 x 4 1/4	415	5.2	8054	105-2200	7-3 x 11 1/8	Y	Cla 270V	5	Wils 5002L	W/2	H Wils F551H	L4HV	335	782	A	CD	61	9 1/2 x 2 1/2	L		
36	105D (4x4) 2 1/2-3	***	170 190	23500	8700	7.75/20D	9.00/20	6-4 x 4 1/4	415	5.2	8054	105-2200	7-3 x 11 1/8	Y	Cla 270V	5	Wils 5002L	W/2	H Wils F551H	L4HV	335	782	A	CD	61	9 1/2 x 2 1/2	L		
37	105D (4x4) 2 1/2-3	***	170 190	23500	8700	7.75/20D	9.00/20	6-4 x 4 1/4	415	5.2	8054	105-2200	7-3 x 11 1/8	Y	Cla 270V	5	Wils 5002L	W/2	H Wils F551H	L4HV	335	782	A	CD	61	9 1/2 x 2 1/2	L		
38	Coleman	3800	120 144	12800	7200	9.00/24	9.00/24	6-4 x 4 1/4	393	4.4	7600	103-2600	7-3 x 11 1/8	Y	Fu Ru 16	4	Wils CR15	2F	H 4.66-8.05	Wils CF15	W2/AM	440	476	D	TD	78	10 1/2 x 3 1/2	L	
39	3300	3300	130 180	18000	8000	7.75/24	9.75/24	6-4 x 4 1/4	428	4.4	7280	107-2600	7-3 x 11 1/8	Y	Fu Ru 16	4	Wils CR15	2F	H 4.66-8.05	Wils CF15	W2/AM	440	476	D	TD	78	10 1/2 x 3 1/2	L	
40	3300	3300	130 180	18000	8000	7.75/24	9.75/24	6-4 x 4 1/4	428	4.4	7280	107-2600	7-3 x 11 1/8	Y	Fu Ru 16	4	Wils CR15	2F	H 4.66-8.05	Wils CF15	W2/AM	440	476	D	TD	78	10 1/2 x 3 1/2	L	
41	3300	3300	130 180	18000	8000	7.75/24	9.75/24	6-4 x 4 1/4	428	4.4	7280	107-2600	7-3 x 11 1/8	Y	Fu Ru 16	4	Wils CR15	2F	H 4.66-8.05	Wils CF15	W2/AM	440	476	D	TD	78	10 1/2 x 3 1/2	L	
42	3300	3300	130 180	18000	8000	7.75/24	9.75/24	6-4 x 4 1/4	428	4.4	7280	107-2600	7-3 x 11 1/8	Y	Fu Ru 16	4	Wils CR15	2F	H 4.66-8.05	Wils CF15	W2/AM	440	476	D	TD	78	10 1/2 x 3 1/2	L	
43	3300	3300	130 180	18000	8000	7.75/24	9.75/24	6-4 x 4 1/4	428	4.4	7280	107-2600	7-3 x 11 1/8	Y	Fu Ru 16	4	Wils CR15	2F	H 4.66-8.05	Wils CF15	W2/AM	440	476	D	TD	78	10 1/2 x 3 1/2	L	
44	Corbett	2375	143 180	14200	4420	9.50/20D	7.50/20	6-3 x 3 1/4	245	5.4	8162	72-3000	7-2 3/4 x 10 1/4	N	WG T9	4	Tim 53013H	SF	H 5.14-6.6										

Four-Wheel-Drive

(*) F.W.D.—Road Maintainer

(*) F.W.D.—Road Maintainer

Model	Year	Price	Engine	Transmission	Drivetrain	Options	Notes
78 Marmon	1933	1340	113	113	113	113	113
79 Marmon	1933	1340	113	113	113	113	113
80 Marmon	1933	1340	113	113	113	113	113
81 Marmon	1933	1340	113	113	113	113	113
82 Marmon	1933	1340	113	113	113	113	113
83 Marmon	1933	1340	113	113	113	113	113
84 Marmon	1933	1340	113	113	113	113	113
85 Marmon	1933	1340	113	113	113	113	113
86 Marmon	1933	1340	113	113	113	113	113
87 Marmon	1933	1340	113	113	113	113	113
88 Marmon	1933	1340	113	113	113	113	113
89 Marmon	1933	1340	113	113	113	113	113
90 Marmon	1933	1340	113	113	113	113	113
91 Marmon	1933	1340	113	113	113	113	113
92 Marmon	1933	1340	113	113	113	113	113
93 Marmon	1933	1340	113	113	113	113	113
94 Marmon	1933	1340	113	113	113	113	113
95 Marmon	1933	1340	113	113	113	113	113
96 Marmon	1933	1340	113	113	113	113	113
97 Marmon	1933	1340	113	113	113	113	113
98 Marmon	1933	1340	113	113	113	113	113
99 Marmon	1933	1340	113	113	113	113	113
100 Marmon	1933	1340	113	113	113	113	113
101 Marmon	1933	1340	113	113	113	113	113
102 Marmon	1933	1340	113	113	113	113	113
103 Marmon	1933	1340	113	113	113	113	113
104 Marmon	1933	1340	113	113	113	113	113
105 Marmon	1933	1340	113	113	113	113	113
106 Marmon	1933	1340	113	113	113	113	113
107 Marmon	1933	1340	113	113	113	113	113
108 Marmon	1933	1340	113	113	113	113	113
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124 Marmon	1933	1340	113	113	113	113	113
125 Marmon	1933	1340	113	113	113	113	113
126 Marmon	1933	1340	113	113	113	113	113
127 Marmon	1933	1340	113	113	113	113	113
128 Marmon	1933	1340	113	113	113	113	113
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137 Marmon	1933	1340	113	113	113	113	113
138 Marmon	1933	1340	113	113	113	113	113
139 Marmon	1933	1340	113	113	113	113	113
140 Marmon	1933	1340	113	113	113	113	113
141 Marmon	1933	1340	113	113	113	113	113
142 Marmon	1933	1340	113	113	113	113	113
143 Marmon	1933	1340	113	113	113	113	113
144 Marmon	1933	1340	113	113	113	113	113
145 Marmon	1933	1340	113	113	113	113	113
146 Marmon	1933	1340	113	113	113	113	113
147 Marmon	1933	1340	113	113	113	113	113
148 Marmon	1933	1340	113	113	113	113	113
149 Marmon	1933	1340	113	113	113	113	113
150 Marmon	1933	1340	113	113	113	113	113
151 Marmon	1933	1340	113	113	113	113	113
152 Marmon	1933	1340	113	113	113	113	113
153 Marmon	1933	1340	113	113	113	113	113
154 Marmon	1933	1340	113	113	113	113	113
155 Marmon	1933	1340	113	113	113	113	113
156 Marmon	1933	1340	113	113	113	113	113
157 Marmon	1933	1340	113	113	113	113	113
158 Marmon	1933	1340	113	113	113	113	113
159 Marmon	1933	1340	113	113	113	113	113
160 Marmon	1933	1340	113	113	113	113	113
161 Marmon	1933	1340	113	113	113	113	113
162 Marmon	1933	1340	113	113	113	113	113
163 Marmon	1933	1340	113	113	113	113	113

† Denotes New Models or Changes in Specifications.

Line Number	MAKE MODEL	GENERAL (See Keynote)			TIRE SIZES		ENGINE DETAILS										TRANSMISSION		REAR AXLE		FRONT AXLE	BRAKES				C-A Dimension (Std. W. B.)	FRAME			
		Tonnage	Chassis Price	Standard Wheelbase	Max. Wt. Gross Vehicle	Max. Tires	Chassis Wt.	(Stripped)	Standard Front and Rear	Maximum Tire Size	Dual rear Single rear	ENGINE DETAILS					Make and Model	Forward Spds.	Make and Model	Gear and Type		Drive & Torque	Gear Ratio	SERVICE						
												No. of Cylinders	Stroke and Bore	Displacement	Comp. Ratio	Torque lb. ft.								H.P. at R.P.M.	Number, Diameter, Length			Governor Standard	Make and Model	Make
Six-Wheelers (Continued) (Wheels Driven)																														
1	Fargo 226BK	2F-6	2475	183	106	23600	7000	9.50/20	8.25/20	Wau GRK	6-3 1/2 x 4 1/2	282	5.1	190	82-2800	7-2 1/2 x 10 1/2	NWG T9	4	Tim SBT151	BF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	557	929	G	TX	104	103 1/2 x 3 1/2
2	Fargo 326BK	2F-6-8	4000	201	215	31400	8500	9.00/20	8.75/20	Wau GRK	6-3 1/2 x 4 1/2	355	5.2	224	110-2800	7-2 1/2 x 10 1/2	YBL 7341	4	Tim SBT151	BF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	630	1053	H	FD	124	124 1/2 x 3 1/2
3	Fargo 326BK	4R-8	7200	211	222	42000	13300	9.75/20	10.50/20	Wau GRK	6-3 1/2 x 4 1/2	402	5.2	324	125-2600	7-3 1/2 x 11 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	760	1053	H	FD	124	124 1/2 x 3 1/2
4	Fargo 326BK	4R-8	8200	211	222	42000	13300	9.75/20	10.50/20	Wau GRK	6-3 1/2 x 4 1/2	402	5.2	324	125-2600	7-3 1/2 x 11 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	760	1053	H	FD	124	124 1/2 x 3 1/2
5	Fargo 326BK	4R-8	10200	222	233	42000	12500	9.75/20	10.50/20	Wau GRK	6-3 1/2 x 4 1/2	672	4.4	500	150-1800	4-3 1/2 x 11 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	760	1053	H	FD	124	124 1/2 x 3 1/2
6	Fargo 326BK	4R-8	10200	222	233	42000	12500	9.75/20	10.50/20	Wau GRK	6-3 1/2 x 4 1/2	672	4.4	500	150-1800	4-3 1/2 x 11 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	760	1053	H	FD	124	124 1/2 x 3 1/2
7	Fargo 326BK	4R-8	10200	222	233	42000	12500	9.75/20	10.50/20	Wau GRK	6-3 1/2 x 4 1/2	672	4.4	500	150-1800	4-3 1/2 x 11 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	760	1053	H	FD	124	124 1/2 x 3 1/2
8	Fargo 326BK	4R-10	12250	222	233	58000	13500	9.75/20	10.50/20	Wau GRK	6-3 1/2 x 4 1/2	672	4.4	500	150-1800	4-3 1/2 x 11 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	760	1053	H	FD	124	124 1/2 x 3 1/2
9	F. W. D. M16X6	10	10800	184	204	40000	17200	10.50/20	12.75/20	Wau GRK	6-3 1/2 x 4 1/2	672	4.4	500	150-1800	4-3 1/2 x 11 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	760	1053	H	FD	124	124 1/2 x 3 1/2
10	F. W. D. M16X6	10	12800	204	224	42400	18200	10.50/20	13.50/20	Wau GRK	6-3 1/2 x 4 1/2	672	4.4	500	150-1800	4-3 1/2 x 11 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	760	1053	H	FD	124	124 1/2 x 3 1/2
11	Hen-(7) A-275-F4R	2-6	3475	144	286	21000	7000	9.00/20	9.00/20	Wau GRK	6-3 1/2 x 4 1/2	282	5.1	190	82-2800	7-2 1/2 x 10 1/2	YBL 7341	4	Tim SBT151	BF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	557	929	G	TX	104	103 1/2 x 3 1/2
12	Hen-(7) A-275-F4R	4-8	4900	144	286	32000	10500	9.00/20	9.75/20	Wau GRK	6-3 1/2 x 4 1/2	282	5.1	190	82-2800	7-2 1/2 x 10 1/2	YBL 7341	4	Tim SBT151	BF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	557	929	G	TX	104	103 1/2 x 3 1/2
13	Hen-(7) A-275-F4R	4R-8	6000	144	286	38000	12000	9.75/20	9.75/20	Wau GRK	6-3 1/2 x 4 1/2	402	5.2	324	125-2600	7-3 1/2 x 11 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	700	1055	G	TD	Opt	83 1/2 x 3 1/2
14	Hen-(7) A-275-F4R	4R-12	8000	144	286	40000	13200	9.75/20	11.25/20	Wau GRK	6-3 1/2 x 4 1/2	402	5.2	324	125-2600	7-3 1/2 x 11 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	700	1055	G	TD	Opt	83 1/2 x 3 1/2
15	Hen-(7) A-275-F4R	4R-12	9000	170	290	40000	14000	9.75/20	11.25/20	Wau GRK	6-3 1/2 x 4 1/2	402	5.2	324	125-2600	7-3 1/2 x 11 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	788	1388	G	TD	Opt	83 1/2 x 3 1/2
16	Hug. 971D	4R-7 1/2	8036	175	175	60000	13000	10.50/20	10.50/20	Bad L525	6-4 1/2 x 5 1/2	525	4.8	340	111-2000	7-3 1/2 x 11 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	720	1080	A	TD	88	94 1/2 x 3 1/2
17	Hug. 971D	4R-10	10655	175	175	65000	15100	11.25/20	11.25/20	Bad L525	6-4 1/2 x 5 1/2	525	4.8	340	111-2000	7-3 1/2 x 11 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	1021	1581	A	TD	92	94 1/2 x 3 1/2
18	Hug. 971D	4R-10	13350	175	175	65000	15100	11.25/20	11.25/20	Bad L525	6-4 1/2 x 5 1/2	525	4.8	340	111-2000	7-3 1/2 x 11 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	1006	1602	A	TD	92	94 1/2 x 3 1/2
19	Ind-96SW-75	4R-3 1/2-5	1900	168	156	8000	3200	7.50/20	7.50/20	Her JNC	6-3 1/2 x 4 1/2	425	4.5	176	73-2800	7-2 1/2 x 10 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	530	688	G	TX	93	7 1/2 x 3 1/2
20	Ind-96SW-75	6 1/2-8	1900	168	156	8000	3200	7.50/20	7.50/20	Her JNC	6-3 1/2 x 4 1/2	425	4.5	176	73-2800	7-2 1/2 x 10 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	530	688	G	TX	93	7 1/2 x 3 1/2
21	Ind-96SW-75	6 1/2-8	1900	168	156	8000	3200	7.50/20	7.50/20	Her JNC	6-3 1/2 x 4 1/2	425	4.5	176	73-2800	7-2 1/2 x 10 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	530	688	G	TX	93	7 1/2 x 3 1/2
22	Ind-96SW-75	6 1/2-8	1900	168	156	8000	3200	7.50/20	7.50/20	Her JNC	6-3 1/2 x 4 1/2	425	4.5	176	73-2800	7-2 1/2 x 10 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	530	688	G	TX	93	7 1/2 x 3 1/2
23	Ind-96SW-75	6 1/2-10	1900	168	156	8000	3200	7.50/20	7.50/20	Her JNC	6-3 1/2 x 4 1/2	425	4.5	176	73-2800	7-2 1/2 x 10 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	530	688	G	TX	93	7 1/2 x 3 1/2
24	Ind-96SW-75	6 1/2-10	1900	168	156	8000	3200	7.50/20	7.50/20	Her JNC	6-3 1/2 x 4 1/2	425	4.5	176	73-2800	7-2 1/2 x 10 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	530	688	G	TX	93	7 1/2 x 3 1/2
25	Ind-96SW-75	6 1/2-10	1900	168	156	8000	3200	7.50/20	7.50/20	Her JNC	6-3 1/2 x 4 1/2	425	4.5	176	73-2800	7-2 1/2 x 10 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	530	688	G	TX	93	7 1/2 x 3 1/2
26	Ind-96SW-75	6 1/2-10	1900	168	156	8000	3200	7.50/20	7.50/20	Her JNC	6-3 1/2 x 4 1/2	425	4.5	176	73-2800	7-2 1/2 x 10 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	530	688	G	TX	93	7 1/2 x 3 1/2
27	Ind-96SW-75	6 1/2-10	1900	168	156	8000	3200	7.50/20	7.50/20	Her JNC	6-3 1/2 x 4 1/2	425	4.5	176	73-2800	7-2 1/2 x 10 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	530	688	G	TX	93	7 1/2 x 3 1/2
28	Ind-96SW-75	6 1/2-10	1900	168	156	8000	3200	7.50/20	7.50/20	Her JNC	6-3 1/2 x 4 1/2	425	4.5	176	73-2800	7-2 1/2 x 10 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	530	688	G	TX	93	7 1/2 x 3 1/2
29	Ind-96SW-75	6 1/2-10	1900	168	156	8000	3200	7.50/20	7.50/20	Her JNC	6-3 1/2 x 4 1/2	425	4.5	176	73-2800	7-2 1/2 x 10 1/2	YBL 7341	4	Tim SBT151	WF	R 6.4-9.35	W 131F	Tim 31000H	LAIHV	530	688	G	TX	93	7 1/2 x 3 1/2
30	Ind-96SW-75	6 1/2-10	1900	168	156	8000	3200	7.50/20	7.50/20	Her JNC	6-3 1/2 x 4 1/2	425	4.5	176	73-2800	7-2 1/2 x 10 1/2	YBL 7341	4	Tim SBT151	WF</										

73	Marland (D) TA-420	8-10	10500	9.75-20	Her Elec	6-5x6	707	4.0	5300	176	1800	7-3x17	Y	BL 7341	4	Tim	79720W	2F	H** 8.90	Tim	27050	T61A	761	10500	TD	125 1/2	T	11x3 1/2	P
74	Marland (D) TA-420	10	12000	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
75	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
76	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
77	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
78	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
79	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
80	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
81	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
82	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
83	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
84	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
85	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
86	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
87	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
88	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
89	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
90	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
91	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
92	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
93	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
94	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
95	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
96	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
97	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
98	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
99	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P
100	Marland (D) TA-420	10	14500	9.75-20	Her Elec	6-5x6	707	5.0	4260	148	2000	7-3x17	N	BL 7341	4	Tim	79720W	2F	H** 7.89	Tim	27050W	T61A	761	1354	TD	132 1/2	T	11x3 1/2	P

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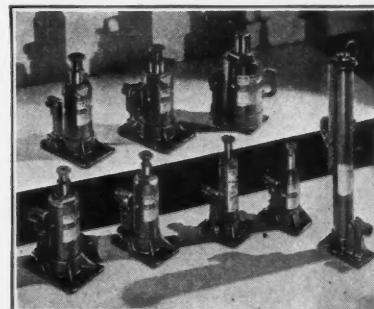


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Three Strikes Are Out

(CONTINUED FROM PAGE 31)

to merit the fatal three in our chart achieved his trio of misadventures all in the same month. One of the prime reasons, no doubt, that he did not acquire any more demerit marks in subsequent months was that his record stopped at the end of that one. After he had been given an opportunity to clear himself and not only failed, but was shown that in all of the accidents he was at fault, he was quietly told that his driving career appeared to lie

elsewhere. But we have many drivers who have worked for us year after year without a single accident. One of our men, who has been with us 15 years, had his last and only accident 11 years ago, and it was not his fault. Another of our drivers has been with the company nine years without participating in a single accident of any kind. Others have worked for the organization even longer periods, without a single mishap of any sort to mar their records.

That the drivers do not regard this rule lightly is shown by their strenuous, at times almost desperate, efforts

to avoid the telltale and damning demerit marks. One driver's truck was hit, one day, by a machine driven by a woman. He considered himself entirely blameless and so informed the other driver. She did not deny the more or less soft impeachment against herself. He told her of our demerit plan and his anxiety to keep his record clear and asked if she would acknowledge her blame to his employers. She readily consented and telephoned in, frankly accepting all responsibility for the collision. Even so, however, the driver still was given his red mark, but a record was made of all of the circumstances and if he had been unfortunate enough to receive two more within the year, these facts would have been given due consideration in dealing with his case.

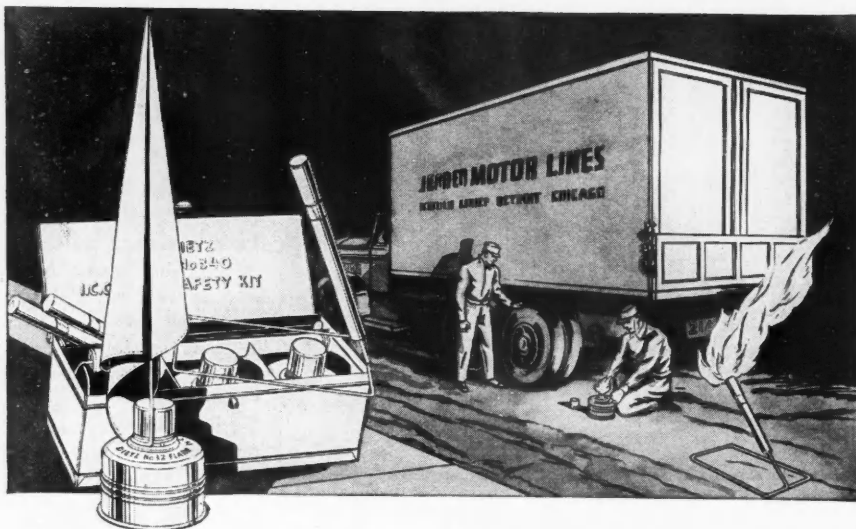
Remember that nearly all of these marks on the chart, which I have mentioned as having been given during 1936, represent minor, in many cases probably insignificant, accidents. Yet the marks are recorded and while they may at times seem severe, they are a big factor in helping to achieve the success we have attained in protecting the public. For the damage to our property is not the main evil we seek to guard against. It is the saving of human lives that is our goal.

THE result of the operation of this plan and of others which we had in effect previous to its adoption and since is that with all of our 123 trucks in almost constant operation and in all of the hundreds of thousands of miles they travel each year, we have had only one serious accident in nine years. And in that one, nine years ago, our driver was shown, unquestionably, to have been without fault.

We have other features in our method of providing safe driving and they have shown themselves effective. We do not replace our drivers often and we never change a driver from his regular truck, unless something we cannot prevent forces us to do so. He drives the same truck year after year, as long as he remains with the company. Thus he learns the peculiarities of his particular truck, how to handle it in traffic and just how it will respond to his treatment of it, all of which makes for safe and sure driving. As another result of this, our turnover in men is very low and we do not continually have to instruct a new bunch of drivers in safe-driving precautions.

In employing such new men as we require, we attempt to select men with a conscience, with a sense of responsibility and dependability. We don't want any of the "oh-what's-the-difference?" type around us. Thus our

(TURN TO PAGE 64, PLEASE)



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ARE your trucks or busses equipped with a fully complete Torch, Fusee and Flag outfit to meet Interstate Commerce Commission Regulations, which go into effect July 1, 1937?

Dietz newly designed No. 340 I. C. C. Safety Kit thoroughly covers these requirements. It consists of a steel Carrying Case, measuring 17 $\frac{3}{4}$ "x7"x6". It is divided into separate compartments for all items and has a strongly hinged lid, fitted with handle. Contents include three No. 32 Dietz Flares, fitted with Dietz reliable Stormproof Burners; two first quality Red Flags, with Staffs; three Fusees, and two round-steel Fusee Burning Holders. The Kit is attractively Enamel finished—Case Green, Flares Buckskin Brown and Green.

The variety of items required for I. C. C. compliance makes it highly desirable to keep them in a compact kit container—all together, clean, neat, ready for instant use—and entirely removed from possible contact with merchandise.

Ask your supply house to show you these new Dietz I.C.C. Safety Kits.

DIETZ

R. E. DIETZ COMPANY, NEW YORK
PIONEER MAKERS OF VEHICLE LAMPS, FOUNDED 1840

HEAD LIGHTS • TAIL LIGHTS • MARKER LIGHTS • DITCH, FOG & SPOT LIGHTS • DIRECTION SIGNALS
TRUCK FLARES • REAR VISION MIRRORS • FLOOD LIGHTS • CATAPHOTE REFLECTORS • FIRE EXTINGUISHERS

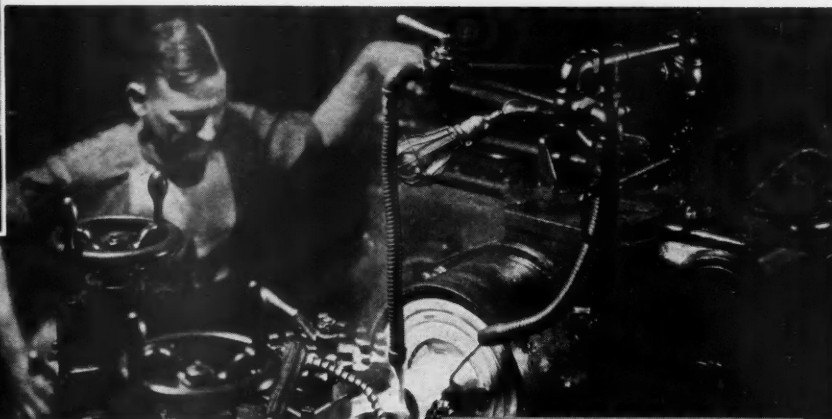
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COMMERCIAL CAR JOURNAL
JUNE, 1937



Photograph Courtesy of
The Warner & Swasey Co.

It's the same in both..
**THE PURCHASE PRICE ALONE
MEANS NOTHING...**



...it's the **COST OF THE
WORK IT DOES** *that counts*

THE ONLY SOUND WAY to figure tire costs is exactly the same way you figure the cost of any productive item you buy for your business. The cost of a turret lathe, for instance, is not the purchase price, but the cost per unit turned out—price divided by work done.

In tires, it's price divided by mileage and payload carried. You can never know what a tire has really cost you until you know how far it has gone and how many tons or packages it has carried.

That's why General Truck Tires have always been built stronger—to deliver greater mileage and haul more payload. It costs more to build a General Tire because of the way it is built. Thousands of truck operators know it costs less to use Generals because of the way they perform. Your local General Tire dealer is ready to offer you the benefit of his factory-training and practical truck tire knowledge. He may be able to reduce your tire costs materially.

THE GENERAL TIRE & RUBBER COMPANY • AKRON, OHIO
In Canada — The General Tire and Rubber Company of Canada, Ltd., Toronto, Ontario

**THE TRACTION
TREAD**

**THE
HIGHWAY**

**THE COMMERCIAL
DELIVERY**

**THE CLEATED
TRACTOR**

**THE
JUMBO**

**THE
ALL-GRIP**

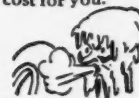


One of the most complete lines in the business—each tire built to give you more miles for less money

GENERAL TRUCK TIRES



STRONGER—All plies are full plies anchored at the bead—no floating "breaker strips"—every inch and every ounce is there for just one purpose—to produce more miles and a lower cost for you.



COOLER—They flex uniformly without that heat-producing "hinging action" of ordinary breaker-strip tires. Heat kills the life of cords and cuts down the miles in a tire. Generals are cool—that's why they run more miles at a lower cost for you.



"COMPACT RUBBER" TREADS—All tires stretch due to fatigue in the fabric, but Generals, having no idle, half-way plies, stretch least of all. The tread is kept compact and compressed against the road—that's why it produces more miles and reduces your cost.

(CONTINUED FROM PAGE 62)
drivers are men who realize they are operating a huge machine capable of dealing out death and destruction of property. They are continually conscious of their tremendous responsibility and act accordingly.

In our efforts, mechanically, to insure safety in driving, our chief concern probably is with our brakes. Of course we watch carefully other mechanical features of our trucks, but brakes must either be in perfect condition or attended to at once. There must be no temporizing nor delay where brakes are concerned. Drivers,

of course, are instructed to watch for any sign of weakness or failure to perform perfectly and to report it at once. A mere word to the shop foreman and he gets immediate attention. If he needs a new set of brakes, he receives it without question, or re-lining or adjustment, or whatever is required. When the danger signal is flashed as to brakes—we act.

OUR drivers are constantly warned that they must obey all traffic laws and regulations and we require them to pay their own fines if they are found guilty of violating any of the motor vehicle

statutes. It may be noted, however, that not one of our drivers was cited for any traffic violation, even the slightest infraction, during the year in question, 1936.

We do not hound our drivers as to speed or hustle on their routes; nor require them to maintain any set schedule whereby they will reach any certain stopping place at any certain time or occupy a certain limited time in going from one place to another. We think this breeds too much hurry and too much likelihood of nervousness on the part of the driver to admit of the maximum of safety and cautious operation of the vehicles. We limit the speed of trucks to 30 miles an hour, although the state law permits 45 miles per hour on the open highway. Yet, if you should follow our drivers you would find that their actual time of movement from store to store almost never varies more than ten minutes at the outside. The amount and character of the merchandise they carry is much the same from day to day and usually it requires about the same length of time to unload the stuff, carry it in, put the racks back up and get going again.

Our trucks are completely inspected, mechanically and otherwise, once a week. This is done on Saturdays and Sundays.

In addition to the big chart of demerit marks which we keep in the shop where the men must see it daily, we also have tacked on the bulletin board several good-sized cards bearing warnings and advice as to careful driving. I consider the following one of the best of these:

"There are three classes of drivers:
Drivers who can't help having accidents;

Drivers who are good enough not to cause accidents;

Drivers who are good enough to keep out of accidents that others cause."

Here is our accident and safety record for 1935 and 1936:

1935—93 drivers, 106 trucks; averaged a total of 80,000 miles per month; total of 59 accidents; in 45 of these accidents drivers absolved from blame; total of claims to insurance company, \$947.

1936—109 drivers, 123 trucks; average mileage per month, 90,000; total of 49 accidents; in 46 of these accidents drivers absolved from blame; total of claims to insurance company, \$700.

And what is the result of all this? Our objective is to save human life and to protect valuable property. But, besides this, because of our good accident record, we hope to deserve lower insurance costs and thus make another saving that can be passed along and reflected in lower retail prices.

YOU NEED THESE BY JULY 1ST



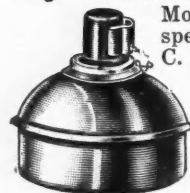
TO MEET UNCLE SAM'S REQUIREMENTS



DO-RAY Universal Truck Mirror

A true universal mirror. With attachment making possible installation on hinge or cab. Can be extended 21 inches from truck body.

List Price \$2.00



DO-RAY SUPER FLARE

More than meets all specifications of I. C. C. and States. With burner cap which protects flame in rain and provides maximum flame at all times.

3 Flares in Container, List Price \$4.50

DO-RAY Angle Bracket Lamp



Can be mounted in many positions on truck. Heavy steel bracket, black enamel finish.

List Price 25c

DO-RAY FOGLITE

A foglite truck-built to stand up under the most severe driving conditions. Special processed. Amber lens throws maximum light on roadway.

List Price \$3.00



DO-RAY NOBBY

The perfect reflector for trucks, buses, and trailers. Heavy metal frame, black enamel finish, thoroughly protected lens. In red, amber, green, or white.

List Price \$1.75



DO-RAY Two-Way Clearance Lamp

Body and bracket bolted together, making it easy to adjust position of lamp. Heavy gauge metal, black enamel finish.

List Price 65c



Write for Reprint of Interstate Commerce Regulations for Accessories Necessary for Fleet Operation

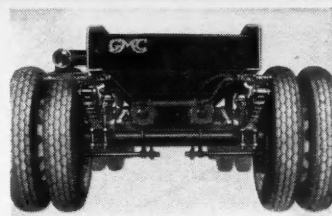
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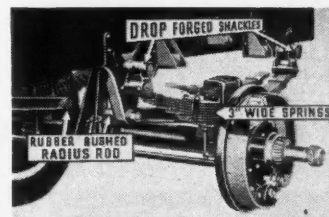
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Trucks and Trailers . . . from the one Reliable source . . . Experienced truck-and-trailer operators everywhere have definitely proved the merit of GMC trucks and GMC trailers not only because of their ability to perform dependably and at low cost but because they are *matched for the job*. Both are "truck-built" throughout to the same high standards of quality. Materials are of the same high grade. The same wearing parts are used. Wheels are interchangeable. Body width matches clearance space behind cab. The complete unit is, in short, designed as a unit, built as a unit and sold, serviced and financed by the same reliable source with no division of responsibility.



Exceptional frame strength; tubular axle for greater rigidity; double-line vacuum brakes.



Rubber-bushed radius rods, drop forged shackles and wide springs are quality GMC features.

GENERAL MOTORS TRUCKS & TRAILERS

GENERAL MOTORS TRUCK & COACH

DIVISION OF

YELLOW TRUCK & COACH MANUFACTURING COMPANY, PONTIAC, MICHIGAN

Contract Carrier Ruling

(CONTINUED FROM PAGE 35)

hand to the common carrier through the requirement of "bilateral" contracts as between contract carriers and shippers.

COMPLAINING that the one power given them by Congress, that of fixing minimum charges, is "at best a remedy difficult and slow of application" and with little other justification, the Commission proposes to examine into the

traffic handled and the various operating and traffic conditions to which minimum charges must be adjusted. In so doing it assumes that Congress intended to confer broad powers to prescribe rules, regulations and procedure which it holds is necessary to successfully perform the single act of prescribing such minimum charges. Supporting this theory, the Commission boldly announces that: "We have no doubt that for the purpose of removing unnecessary hindrances and reducing the difficulties in the way of an effective administration of that system of regulation, we have the power to establish

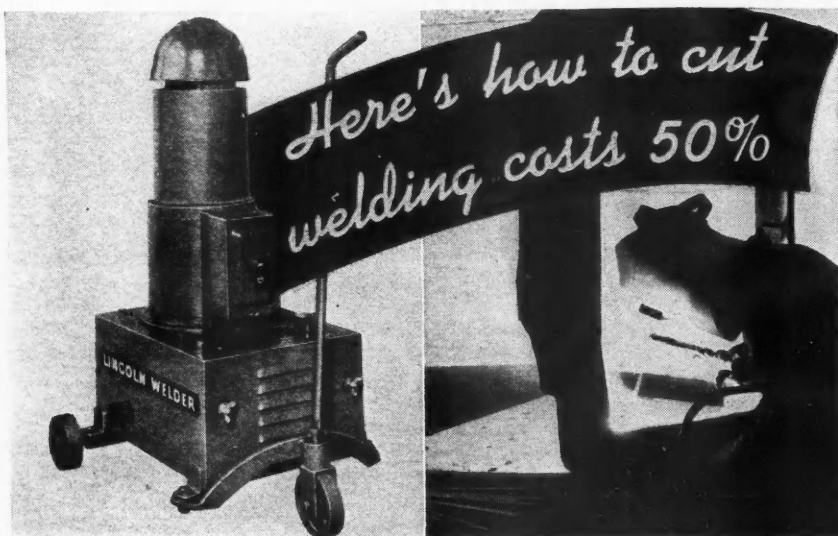
general requirements to which contract carriers must for the future conform." Pursuant to this assumption the decision requires all "contract carriers" to cease and desist on or before July 1, 1937, "from transporting property for hire in interstate or foreign commerce except under special or individual contracts or agreements which shall be in writing, shall provide for transportation for a particular shipper or shippers, shall be bilateral and impose specific obligations upon carrier and shipper or shippers, shall cover a series of shipments during a stated time" and that such contracts shall be preserved by the carriers while they are in force and at least for one year thereafter.

The Commission does not require that the contracts be filed in Washington, although that question is under consideration in a separate proceeding now pending, and this may be the next step in contract carrier regulation.

If the provisions of the new decision are strictly enforced it will tend to slow down contract carrying as it is now conducted and perhaps place the contract carrier in an entirely new position in relation to motor carrier transportation. It will greatly restrict the small carrier accustomed to the securing of "spot" business which must be handled forthwith. If he must wait until a contract is carefully negotiated and drawn the business will have disappeared. On the other hand, shippers accustomed to taking quick advantage of available facilities will be deprived of this privilege since, as Commissioner Lee suggests in a dissenting opinion, they cannot safely "freeze" production and transportation costs over a period of time knowing that competitors may be entering into similar contracts at greatly different rates. Such a producer attempting to comply with the Commission's order might find himself outside the pale of possible competition, due to his having made a contract with a carrier "covering shipments during a stated period of time" in a "bilateral" contract.

Shippers may prefer to patronize only carriers who must adhere to published tariffs rather than to trust to carriers which are free to prescribe one tariff here and another there.

As Commissioner Lee points out, the Commission might have avoided the drastic requirements now being placed on contract carriers and still have been within the procedure prescribed by Congress by increasing the minimum charges sufficiently to preserve the proper balance between the two classes of carriers. It will be interesting to follow the development of this regulation which may eventually be the end of contract carrying.



ELECTRIC power for welding with a Lincoln Arc Welder costs as little as 5c per hour. You can weld 2 to 3 times faster than by any other welding process. Many fleet repair shops are actually saving from 50% to 75% on their welding costs by the use of a Lincoln Arc Welder.

The Lincoln "Junior" Arc Welder is especially designed for use in fleet repair shops. It is fast, easy to operate and it is as reliable as your other electric equipment or your electric lights. With it you can weld steel, sheet metal, cast iron, aluminum or alloys—anything from sheets of fender thickness to engine blocks or truck frames.

The price of these machines is as low as \$200.00. They are Lincoln quality throughout—convenient terms can be arranged. Write today for details.

THE LINCOLN ELECTRIC COMPANY

Largest Manufacturers of Arc Welding Equipment in the World



THE LINCOLN ELECTRIC CO.
Dept. AF -388 Cleveland, Ohio.

Send details about the SA-75, SA-100 and SA-150.

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COMMERCIAL CAR JOURNAL
JUNE, 1937

Can Battery Failures Be Charged to Generators?

(CONTINUED FROM PAGE 29)

manufacturer cannot know the service that the truck is going to engage in and consequently cannot know what the demands on the battery are going to be so it is up to the fleet operator to study the electrical loads of the vehicle and specify the battery size accordingly. The battery that comes in a truck where no special size is specified is for an average condition.

The battery is simply a storage mechanism from which current can be drawn when the generator is not in operation. It is not a source of current because it creates none. All of the current that is taken from a battery must be put into it by the generator. In addition the generator must apply the current requirements for the vehicle in operation.

The electrolyte of a fully charged battery will show a specific gravity reading of 1.280 on a hydrometer but most battery engineers agree that a battery in average use should not be kept in such a highly charged condition. Fleet operators will add that it is impossible to keep a battery in this condition. The engineers agree that a battery with a specific gravity reading of from 1.240 to 1.260 is "living right" and that there is little danger of too fast cycling, constant shortage of water and a sudden demise due to dissipation.

ONE of the benefits of keeping the battery in the higher charge brackets which is entirely aside from outright failure of the battery at embarrassing moments is the superior lighting which results from having a battery in good condition. In charging a storage battery the generator output must come at 1 to 1½ volts more than the battery voltage in order to make it battery input instead of battery outgo. The voltage of the automotive generator will automatically increase to overcome the resistance of the battery voltage. Hence if the battery voltage is down to around 4½ volts, the generator will produce around 5½ volts which will give only fair illumination. Without the generator in operation the illumination from the battery would be decidedly poor. The accompanying graph can be used to figure the results from any given condition. Allow .3 volts drop between battery and headlights. This graph is for 32-candlepower bulbs.

The generator which supplies all of the current for motor vehicle operation is a device for taking mechanical energy from the engine and changing it into electrical current. Supplying a generator for an average condition

would be no trick at all but in the truck industry there is no average condition. The house-to-house delivery and sales vehicles have an entirely different problem than the large over-the-road trucks. Some trucks are used almost entirely at night while others are seldom at work later than dusk. Some trucks work in the city at low speeds and others between cities at relatively high speeds. No generator can satisfactorily meet all of these conditions.

Since the highly specialized use of trucks began and since the lighting laws have been throwing a heavier lighting load upon the truck electrical

equipment it has become increasingly apparent that the fleet man must make a special study of generators so that he can make an intelligent selection of generators to fit his needs. It is also obvious that generator maintenance and repairs have become more important. With the increase in generator problems has come the opportunity to effect economies in this department.

THE selection of a generator rests largely in securing a generator which has a sufficiently high maximum output (TURN TO NEXT PAGE, PLEASE)



Four
**NEW VAN DORN
PORTABLE
ELECTRIC
SANDERS**

**with More Power
for Less Money**

Here are the greatest sander values Van Dorn has ever offered.

NEW 7-INCH STANDARD SANDER (illustrated) built for continuous service—with ample power and ruggedness.....\$53.00.

NEW 7-INCH JUNIOR SANDER—a powerful tool for intermittent service at the lowest price in Van Dorn history.....\$39.50.

NEW 7-INCH HEAVY DUTY SANDER—built for high speed use on continuous production work.....\$75.00.

NEW 9-INCH STANDARD SANDER—designed and built for more efficient work on larger areas.....\$78.00.

One of the four new Van Dorn Sanders will exactly suit your requirements. Ask your Jobber for a demonstration, or write for catalog. The Van Dorn Electric Tool Co.; 732 Joppa Road, Towson, Md.
(Div. of The Black & Decker Mfg. Co.)

**FOR POWER
SPECIFY**

Van Dorn
PORTABLE ELECTRIC TOOLS

THE PAYMENT PLAN

(CONTINUED FROM PAGE 69)

and then one that will provide this output at the speed at which the truck is to be operated. Some adjustment can be made by changing generator pulley sizes. Changing from a larger to a smaller pulley will give the maximum generator output at a slower vehicle speed and a larger than normal pulley will cause the generator to produce the most current at higher than normal speeds.

The real regulation of the generator output and consequently the real safeguards of the battery's condition are the current and voltage regulators. In

TABLE OF TRUCK ELECTRICAL LOADS

		Amp. Each	
	C. P.	6-V.	12-V.
Headlamps	21	3.50	1.60
Headlamps	32	4.75	2.25
Tail, Inst., Marker Lamps	3	.75	.50
Spot or Road Lamp	21	3.50	1.60
Spot or Road Lamp	32	4.75	2.25
Ignition		2.00	1.00
Heater (Hot Water)		4.00	2.00

order that fleet maintenance men can become thoroughly familiar with the regulators and with the generators COMMERCIAL CAR JOURNAL will publish a series of articles on generators and

regulators. These articles will give in detail the construction of these units and detailed articles on their maintenance as well as diagnosis of troubles that occur in the electrical system.

Getting from Behind the Eight Ball with Pooling

(CONTINUED FROM PAGE 28)

first instance, with three or four exceptions, all the emergencies have either developed on the golf course or in a downtown movie where the wife and kiddies were taken along to help clear up the trouble. These cars are also to be found far afield on weekends and holidays, where their appearance does the company no good from any standpoint and especially from the public relations angle. Although the drivers may not realize it, the public does notice these things and they are usually brought out when some state or city governing body is discussing rates and are used to illustrate the extravagance of the company. In the second instance a glance into the company parking space will probably reveal that the car spends most of the day in the bay assigned to it on the lot, although the employee to whom it is assigned is just leaving to call on a customer.

THERE are, of course, many other abuses and headaches connected with this type of operation. The employees to whom cars are assigned become "my car" minded and woe betide anyone else in the organization, unless it be the president of the company, who is so foolhardy as to try to borrow this car to attend to a little company business. In some instances the car will become so necessary to the well-being of the family that the employee will find it necessary to use either a street car or bus to reach the office and the only time that the company will have contact with the vehicle is when it stops at the garage for gasoline, oil or service. And speaking of service, maintenance on the units usually costs considerably more than for the cars pooled for general use, no matter how high the fleet maintenance standards may be. These people seem to expect much more in the way of perfection in a company automobile than they would from their personal cars. Cars come into the garage continually for the removal of imaginary misses, knocks, rattles and what not that the best mechanic is unable to locate.

(TURN TO PAGE 72, PLEASE)

AUTOPULSE ELECTRIC FUEL PUMP

FOR UNINTERRUPTED SCHEDULES AND GREATER FUEL ECONOMY



Most miles for your fuel gallonage—and no more fuel supply failures—how vital these points are! Read how, on your own jobs, Autopulse can begin saving and earning dollars for you:

● AUTOPULSE MEANS ECONOMY

Mounted away from the motor, it supplies COOL fuel while camshaft pumps, being mounted on the motor, deliver fuel so heated, that a large percent passes out through the carburetor vent in the form of vapor and is wasted. In hot weather every tenth gallon may be wasted—think of that loss!

● CURES VAPOR LOCK

Vapor lock, common with engine mounted pumps because they suck bubbles when heat boils the gas, is unknown with Autopulse, since it can be mounted in a cool spot where it pushes fuel in a solid stream.

● INSTANT PRIMING

Autopulse fills the carburetor the instant the ignition is turned on. There is no repeated use of the starter or drain on the battery by forcing the motor to pump its own gas. Quick starting is assured even in zero weather.

● EXCLUSIVE MULTIPLE ADVANTAGES

With Autopulse Multiple Hookups, the failure of one pump does not affect the others—you always get in under your own power.

● IDEAL FOR DUAL USE

Expensive towing and costly delays due to failure of the fuel feed system can be avoided by using Autopulse as an additional pump where an engine is already pump equipped. Instructions shipped with every pump.

● EXCHANGE AND REPAIR SCHEDULE

Permits new pump purchases at a saving with turn-in of vacuum tank, mechanical pump, or ANY type Autopulse or purchase of factory rebuilt pump with new pump guarantee.

AUTOPULSE CORPORATION
DETROIT • MICHIGAN



**FAST DELIVERY SCHEDULES
DEPEND ON SPARK PLUGS
YOU CAN DEPEND ON
CHAMPIONS**

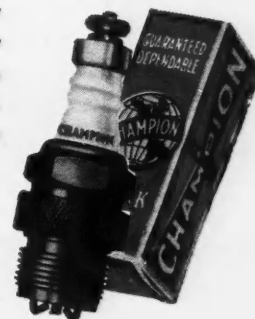
Most bus and truck operators, whether large or small, realize that their very livelihood depends upon the maintenance of fast delivery schedules. They can't afford to operate equipment which is not at all times dependable.

That's why the majority depend on Champion Spark Plugs to keep their equipment rolling—to keep their operating costs down—to do away with costly delays caused by improper plugs or plugs less dependable than Champions.

That's why the Gordon Transport, Inc., Memphis, Tenn., write, "We operate our fleet between Memphis and

Chicago, New Orleans, St. Louis and Oklahoma City. All these long hauls are made at high speeds and we have found Champion Spark Plugs stand up best and give the maximum amount of spark plug mileage."

Let us send one of our factory representatives to show you how Champion Spark Plugs can help you maintain fast delivery schedules. They have helped solve many perplexing hauling problems.



CHAMPION

EXTRA-RANGE SPARK PLUGS

CHECK AND CLEAN SPARK PLUGS WHEN YOU CHANGE OIL

COMMERCIAL CAR JOURNAL
JUNE, 1937

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(CONTINUED FROM PAGE 70)

When the time for replacement rolls around there is a tendency to try to step up into a higher price range and, of course, all of these units must be equipped with the latest gadgets provided for the comfort and amusement of the user. The single horn with which the manufacturer has equipped his product does not command sufficient attention so it becomes necessary to purchase something that emits a noise that sounds like a cross between a Pipe Organ and a dance band.

THE policy of making allowances to

employees to cover the use of their personal cars on company business does not have as many objectionable features as is the case with the practices just described. It is usually more costly to the company due to the fact that the rate of compensation is higher than the cost of operating company equipment and as a rule the employee feels that it should be higher. Most employees try to be fair in reporting this type of mileage, however, though there are some circumstances where the line of demarcation between personal and business use is not very well defined. As a result, the employee

in an effort to be fair either leans over backwards and does not get all that is coming to him or he goes to the other extreme and brings down upon himself the suspicions of the auditors and the Automotive Supervisor that somewhere in his report is concealed the cost of a new tire or an overhaul job on the old bus. Then, of course, there will be a few employees who think that this mileage should start from the time they leave their homes in the morning and include all use until the car is returned at night.

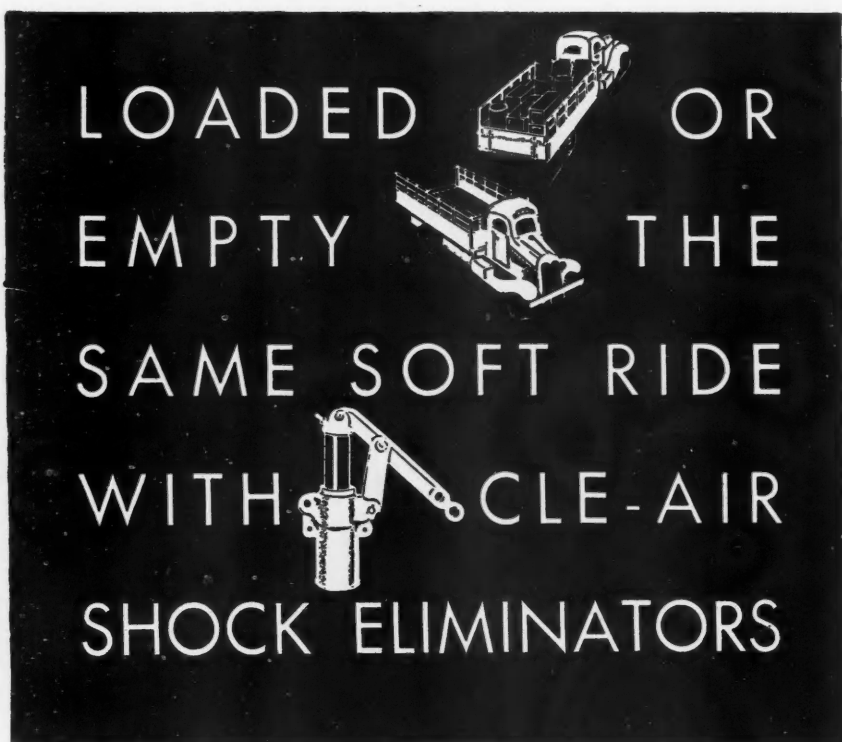
SO much for that side of the picture. Pools can and should be so set up as to avoid objectionable and expensive features and encourage the joint and correspondingly economic use of passenger car equipment. The pooling arrangement that I am about to describe does this. It covers the operation of a spread fleet of 272 motor vehicles serving 160,000 customers living in a territory covering 10,000 square miles.

The territory is divided into 10 districts and the fleet into 13 pools. There are two pools located in each of the two large cities served and one pool serving the entire territory and operating out of the transmission department headquarters. The fleet is composed of 97 passenger cars, 87 half-ton trucks, 64 1½-ton trucks and 24 trucks ranging in size from 2 to 3 tons. Twenty of the trucks are used exclusively by the Transportation Department in the three cities in which the company operates a street railway and bus system. That leaves 252 vehicles to serve the 160,000 electric and gas customers.

All of the pools are operated on the same basis and the regulations governing their operation apply to all officers and employees of the company. All of the passenger cars and most of the trucks are pooled. It is, of course, impossible to pool all of the trucks in a public utility fleet as these fleets usually contain several pieces of equipment designed for special applications such as street light and substation maintenance. It is, however, practical to so design other units in the fleet that they can be used by several departments.

The trucks in the fleet under discussion include in the half-ton class, pickups, meter and rural service types. The straight pickup always comes in handy and fits well into any pool. It is frequently used as a passenger vehicle when the demand for that type of equipment exceeds the supply. The meter body is so arranged that it can be used by the meter, installation or service departments and the rural service body

(TURN TO PAGE 75, PLEASE)



LOADED OR
EMPTY THE
SAME SOFT RIDE
WITH CLE-AIR
SHOCK ELIMINATORS

● Sixteen years of applying compressed air to shock absorption in every major transportation field furnishes a rich background for Cle-Air Shock Eliminators—the compressed air units for rear end installation.

Ideal for use on trucks, buses and commercial trailers, Cle-Air Shock Eliminators perform the triple functions of helper springs, shock eliminators and rebound snubbers.

Moderate in price, mighty in performance, these new but proven units merit your careful investigation.

THE CLEVELAND PNEUMATIC TOOL CO.

Automotive-Aircraft Division

CLEVELAND, OHIO, U. S. A.

**AIR SHOCK ELIMINATORS FOR TRUCKS
BUSSES, AIRPLANES AND RAILROADS**

(CONTINUED FROM PAGE 72)

lends itself to appliance delivery as well as to the meter installation and service work.

The 1½-ton class includes heavy installation trucks that are equipped to handle overhead or underground installation work and to build light private lines. Those equipped with stake bodies readily lend themselves to general use such as the delivery of major appliances, hauling freight and material and tree trimming and line construction or maintenance where there are no poles to be set. Some light and heavy line trucks are also pooled. These units are transferred from one pool to another as the company activity may require.

Regarding the passenger cars, none are reserved or permanently assigned to individuals, and there is no compensation to cover the use of a personally owned car on company business. In fact, the use of personal cars is discouraged by executive order. No passengers, even employees, who are not on company business are permitted. All of the passenger equipment is of the same make and type so as to avoid any possibility of discrimination in connection with assignments. An employee traveling from one city to another who wishes to take his family with him may use his own automobile and include in his expense account railroad fare for himself between the two points.

The operation of each pool is handled by a dispatcher who works under the supervision of the Supervisor of Automotive Equipment. He also prepares the daily and monthly reports, forwarding them to the office of the supervisor. In the small districts where the number of units in the pool does not justify the employment of a full-time man, the dispatching and reports are handled by the assistant to the district manager or local superintendent and a proportionate part of the salary is charged against automotive operations.

Employees finding it necessary to use a car apply to the dispatcher usually a day in advance of the contemplated trip, although this is not necessary. Those traveling alone between two points on the system are encouraged to use railroads and buses as much as possible as these are now less expensive than the cost of operating an automobile with only one passenger. However, in most instances covering trips to the various district offices, the general and divisional office employees schedule their visits so that from two to five make the trip together. There will, of course, be occasions when, although only one person is making the trip, it is not practical to carry other passengers, such

as when a car is used by the Claim or Right-of-Way Department, but even in these cases it is frequently possible to arrange for another employee to be moved to his destination thus saving the cost of operating an additional car. Since it is the practice to charge the cost of operating automotive equipment back to the department using the vehicle on a mileage basis this practice of riding in groups results in a saving in departmental operating expense as the charge for the trip is divided among the departments whose

men used the automotive equipment.

Each person to whom a car is assigned is given a trip slip which must be correctly filled out and turned in to the dispatcher when the car is returned to the pool. This slip provides space for the name of the driver and his department, the time out and in and the speedometer reading at the start and finish of the trip. Space is also provided for an adequate description of the work for which the vehicle was used, notation of tire

(TURN TO PAGE 78, PLEASE)



43 to 1 - a somewhat mysterious headline perhaps, but one which, nevertheless, emphasizes an important point. This ratio represents the results of a test in which a journal of 2 in. diameter was run in a white metal bushing at 500 r. p. m. and 230 lbs. per sq. in. load. Oil was fed to the assembly until stable conditions of lubrication were obtained. The supply was then cut off and the bearing seized in 36 minutes. The experiment was repeated, but this time oil containing "dag" colloidal graphite was used. The journal ran for over 26 hours before tightening in the bearing was noted. This test indicates that graphoid surfaces, possessing low friction properties, will, for surprisingly long periods, safeguard against metal-to-metal contact during breaks in the lubricating film. Write for copy of Booklet 600 describing "dag" colloidal graphite.

Ask your oil supplier about his colloidal-graphited oils today
ACHESON COLLOIDS CORPORATION
 PORT HURON MICHIGAN

dag
 COLLOIDAL PRODUCTS

COLLOIDAL GRAPHITE

DAG COLLOIDAL GRAPHITE IS A 100% AMERICAN MADE MATERIAL

ACHESON COLLOIDS CORP., PORT HURON, MICH.
 Please send gratis, story on "dag" Colloidal Graphite.

NAME

ADDRESS

How to Sell- **MORE** **TRACTOR-TRAILER** **JOB**



Your commercial sales and profits can be greatly increased if tractor-trailer combinations are simplified and the job of selling them made easy for the salesman who knows nothing of transportation engineering. Tractor selling must be made simple and attractive if all of your salesmen are to get their share of the rapidly expanding tractor-trailer market.

Thanks to the perfection of electric brakes you can now sell and deliver tractor-trailer combinations as easily as you sell and deliver passenger cars. The leading trailer makers will quote you trailer prices which include *complete electric braking equipment*. Trailers are delivered to you with the entire braking system installed on the trailer. Connecting cable and driver's control are included and can be installed on the towing vehicle by

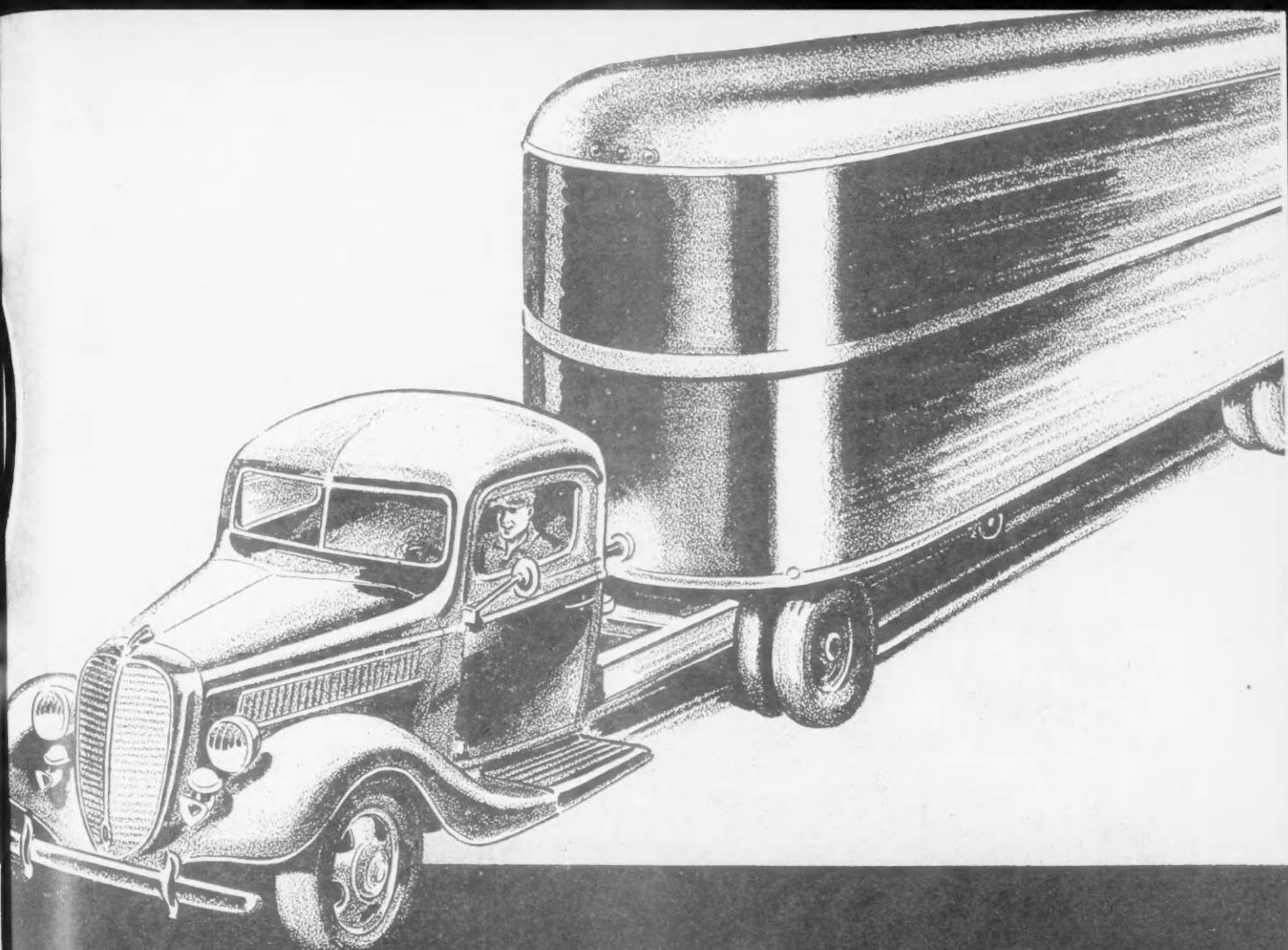
any of your mechanics in a half hour's time. By specifying electric brakes on the trailers you sell, you can complete delivery without purchasing anything extra or additional in the way of braking parts or accessories and no special engineering knowledge is necessary.

Now Used By Many Large Fleet Operators

Electric brakes have long since passed the experimental stage. They have now been adopted as either standard or optional equipment by practically all manufacturers of trailers and are used in tractor-trailer or similar service by such organizations as The Pure Oil Co., all subsidiaries of The American Telephone & Telegraph Co., The Commonwealth

WARNER *Electric* **BRAKES**

Ask For Trailer Quotations Complete



Southern Corp., Curtis Publishing Co., Penn. Power & Light Co., Standard Oil Co. of Ohio, the United States Army, and many others.

Sell Tractor-Trailer Combinations as a Complete Unit "Package"

Tractor-trailer combinations are now as easy to sell and service as passenger cars. When you ask for quotations from Trailer Manufacturers simply specify "Electric Brakes". Then add the trailer price to the price of your standard chassis. You then have a complete

"package" with no extras. Salesmen who have never sold anything but passenger cars before can step into the tractor-trailer picture instantly. Investigate the Warner Electric Brake at once. This means too much to you to neglect. Write for all the facts concerning Electric Brakes. Let your salesmen read the Warner Brake Manual. Then they can sell tractor-trailer combinations and answer any of their customers' questions intelligently.

WARNER ELECTRIC BRAKE MFG. COMPANY
BELOIT WISCONSIN

Mail Coupon For The Warner INFORMATION and SERVICE MANUAL

It describes the construction and operation of electric brakes in detail and contains complete instructions for installation and transfers from one towing vehicle to another. Electric Brake Wiring Diagram and the Warner Guarantee. Every dealer should have a copy.

WARNER ELECTRIC BRAKE MFG. CO.,
 Beloit, Wisconsin
 Please mail us copy of INFORMATION AND SERVICE MANUAL for Warner Electric Brakes.

Firm Name _____
 Address _____
 City _____
 Individual's Name _____
 State _____

CCJ 6-37

te With Electric Brake Equipment

(CONTINUED FROM PAGE 75)

changes, if any, and the condition of the vehicle. The description of the vehicle's activities if transferred to a monthly report form with charges made to the accounts affected and turned over to the Accounting Department to be used as the basis for charging the various departments for their use of automotive equipment.

IN setting up an operation of this type it is necessary to give consideration to the present and immediate future activities of the company, the probable and possible demands that

will be made upon the pool for equipment and the operating and construction practices in order to ascertain the number and various types of vehicles that will be required to meet this demand. Consideration should also be given to present trends in the industry which may not yet be reflected in the company's operations. One of these which is rapidly becoming popular with the companies in the southwest is the district representative plan. These district representatives are stationed in small towns or rural districts located about fifty miles from the division or district offices. They

usually handle from four to six hundred customers, reading meters, collecting bills, shooting trouble, running services and selling and delivering appliances. They eliminate the necessity for frequent trips from pool centers and the saving in time and mileage much more than justifies this practice.

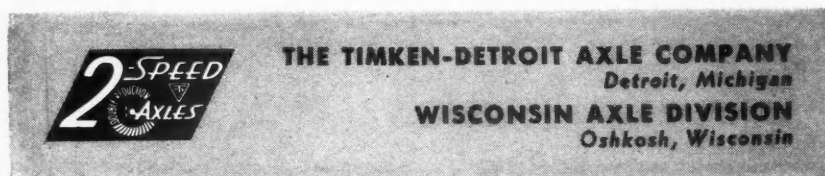
A study of past operations covering, if possible, a three or four-year period should be made in order to determine the peak load period. It will be very helpful to know what day of the week and at what month during the year the greatest demands are going to be made on the pool. This should be broken down far enough to include mileage operated in the past by individuals and departments with an analysis of the use so as to be able to estimate the mileage that may be eliminated by pooling. Other important items to consider are such things as customer density, average length of time consumed on calls, the condition of the equipment and the maintenance practice to be followed. This should include an estimate of the time vehicles will be out of service for inspection, maintenance and repairs.

Having ascertained the demands that will be made upon the pool the next problem is to determine the proper number of vehicles of various classes that will be required to take care of this demand. Right here is the spot to be ultra conservative. Remember that a pool of this type is not going to be received with three rousing cheers by the rank and file, and that it is due to receive a cold reception. Many people will spend a lot of time looking for flaws and telling each other why it will not work. If it is determined that fifty cars will be more than sufficient to meet the demand, keep fifty-five on hand. There will be an abnormal demand for awhile as everyone tries the pool out to see how it is going to work in the hope that they will find no car available. After one or two turn downs the story may get around that this or that department can no longer get any work done because of the lack of transportation. A check of the dispatcher's sheets will show that the department involved has had more use of transportation under the pool than in past years but those one or two turn downs will look as big as the Empire State Building. It is far better to have more equipment than is necessary at the start of a pooling system and to cut back gradually as the operation begins to function smoothly than to start with an apparent shortage that gives the impression that more vehicles are needed.

IN setting up the pool under discussion
(TURN TO PAGE 80, PLEASE)



- ▼ it is double reduction, by Wisconsin; a type of drive never before available except in high-priced trucks.
- ▼ big, husky gears promise freedom from troubles, assure long life, dependability; and *deliver* them.
- ▼ utmost simplicity; only three added working parts; perfect accessibility; and instant interchangeability with your present Timken Axle.



Controlled Power

Makes the **FWD** A Safe, Sure-Footed Truck on All Roads!

The best "showroom" for the FWD Truck is the great outdoors. There—in mud, sand, loose soils, snow, and on slippery or icy pavements—its *Controlled Power* has won a large and loyal following . . . The famous Four-Wheel-Drive principle — that of equalized power and load distribution — gives the FWD Truck sure, positive traction. It's a safer truck and one that's sure to "get through," regardless of how strenuous the tasks before it may be . . . In FWD construction, a center differential distributes power equally to all four driving wheels—and this power is always headed in the same direction in which the driver is steering. It is not operating at cross purposes . . . Test your trucks by their road performance. Put the FWD in

the hardest service you have. You'll find it is more reliable—safer—and more economical. Write us for more specific information pertaining to your own hauling problems.

FWD Controlled Power Means . . .

- Greater Safety
- Faster Service
- Greater Dependability
- Wider Range of Operation
- Operating Economy



FWD

THE FOUR WHEEL DRIVE AUTO CO.
CLINTONVILLE, WISCONSIN
Canadian Factory, KITCHENER, ONTARIO

FOUR-WHEEL-DRIVE TRUCKS

THE SAFEST TRUCK ON THE HIGHWAY

(CONTINUED FROM PAGE 78)

sion it was determined by survey that company activities requiring transportation reach their peak in May and September. Having ascertained the mileage demands that these peaks would make upon the various pools, cars were assigned on the basis of one for every 1400 miles of demand per month. This indicated that 92 cars would be ample to take care of all requests, but just to be on the safe side and avoid complaints, 98 were kept in service.

During the two peak months of 1936 passenger cars averaged 1630 miles

per month, the monthly average for the year was 1385 miles. There is one car in the pool for every 37 miles of distribution line or for every 1577 customers. The investment in passenger equipment amounts to .365 cents per customer. Automotive maintenance costs for 1936 amounted to 75 cents per customer. This included all vehicles.

Changing to pool operation made it possible to drop 25 passenger cars from the fleet and resulted in a reduction of 384,000 miles of operation. This together with the change from heavy to light equipment brought a cash saving

of approximately \$42,000 as compared with the cost of the previous year's operations.

Another item which has had some bearing on the reduced cost of operation is the fact that all vehicles are now equipped with governors. Passenger car speeds are limited to fifty miles per hour, half-ton trucks to 45 and other trucks to 40. All vehicles are inspected every 1000 miles and such adjustments as may be found to be necessary are made during these inspections. As every effort is made to keep equipment available for service during the day, most of the inspection and maintenance work is done at night. Most of the garages are now equipped with rotary lifts that are well lighted. The lighting installation includes four flush type flood lights set in the floor underneath the lift and six angle-type, vapor-proof reflectors suspended from the ceiling furnishing sufficient light for work on any part of the vehicle.

Mechanics come to work at 3 and work until 11. In the small groups, time not spent on automotive equipment is used on other work that can be done around the garage such as stenciling water heaters and ranges for the Stores Department or doing some repair work for the Distribution Department. The salary of these men is, of course, divided among the departments affected. In the Transmission Department automotive inspection and maintenance is handled by the standby men in the line crew who happen to be good mechanics. This idea will not always work out so well but it so happens that these men take a great deal of pride in the appearance and condition of the equipment operated in this pool and they take care of it accordingly. Maintenance and operating costs in this pool are the lowest in the fleet.

In addition to the inspection and maintenance work done by the mechanics, each vehicle in the fleet is inspected every six weeks by the safety engineers. These men check such things as lights, brakes, steering, general mechanical condition and house-keeping. Governors are also checked. The safety engineers carry the governor keys.

FINALLY, may I say that, although it may sound like it, I do not think that the ideal pool set-up has been attained in the one just described. I believe that it is a step in the direction of efficient and economical operation of a public utility fleet but there are still many improvements in operating technique that can be made together with improved maintenance practices, that will result in still greater economy.

Fleet Operators Know That MORE TONS GO MORE MILES FOR LESS DOLLARS

with

WARFORDS

Low ton-mile costs are the rule with Warford Ten-Wheelers due to the unbeatable combination of the Ford V-8 Motor and the Warford Dual Axle Drive Chassis. Heavy duty hauling capacity with light truck economy.

The eight-wheel traction and ten-wheel braking of the Warford Ten-Wheeler insure safe arrival of your loads anywhere, whether road surfaces be rough, smooth, soft, or slippery. And the extra gear ratios of the Warford Super-Auxiliary Transmission keep ten-ton loads well within the reach of the Ford V-8 engine.

Ask your Ford dealer or nearest Warford Distributor to show you how you can get more ton-miles for less dollars with Warford Multi-Wheelers, or write us for details.



Tree Crane mounted on a WARFORD Ten-Wheel Chassis equipped with Dual Ratio Axle and a special WARFORD "Amidship" Transmission to carry power take-off units for operation of crane.

THE WARFORD CORPORATION
44 WHITEHALL STREET NEW YORK, N. Y.

THESE ARE THE DAYS WHEN FLEET OWNERS APPRECIATE THE **CARTER** *Anti-Percolator*



WITH today's fuel, complaints of hard starting are as apt to be heard during the hottest days of summer as in winter.

When a hot motor, using a down draft carburetor, is stopped, unless preventive means are supplied the fuel boils over and runs down into the intake manifold—making the motor hard to start, wasting gas, and washing the lubricant from the cylinder walls.

Because the Carter anti-percolator prevents this boiling fuel it assures easy starting and economical operation even in the hottest days.

Naturally this exclusive Carter feature has been welcomed in the fleet field.

CARTER CARBURETOR CORPORATION

2820-36 N. Spring Ave.
ST. LOUIS, MO.

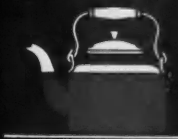
Division of American Car and Foundry Company

● Put a teakettle full of water on a hot stove. As soon as the boiling point is reached the water is forced out of the spout. To stop this boiling over you simply lift the lid of the teakettle.

The action of the Carter anti-percolator on a down draft carburetor over a hot motor is exactly the same.



Percolating



Anti-Percolating

CARBURETER



SAE Meeting

(CONTINUED FROM PAGE 21)

"12. Uniform tire loads with equal wear.

"13. With the 'engine-under-the-seat' type particularly, a cooler and easier ventilated driving compartment."

There is such variety in these advantages that the C.O.E. principle can be adapted successfully to all fleet vocations.

The price differential, said Mr. Schon, has been the chief obstacle to wider usage of C.O.E. trucks.

"Up to 1937," he said, "the comeback of the C.O.E. type was handicapped due to limited production and excessively higher prices in comparison to the conventional type. However, several of the larger truck manufacturers have entered the field with light duty models and a more complete line, ranging from the 1½-ton size up to the largest capacities allowed. These ultra-modern vehicles are now available at a much lower cost differential, primarily due to a larger production volume. Should this trend continue it is quite possible that its many operating advantages and greater utility value will

make a place for the cab-over-engine truck in transportation to the extent where the question may arise in future years: Is there a place in transportation for the conventional type of truck?"

In his discussion of advances in C.O.E. design, Austin Wolf, well-known automotive consultant, said the change in weight distribution has called for considerably more study on braking distribution, and the shortened wheelbase calls for an accurate location of the fifth wheel in tractor-semi-trailer service. The fifth wheel must be mounted very close to the tractor rear axle center so the forces coming from the trailer have a minimum effect on the steering conditions of the tractor.

In the case of six-wheeler C.O.E.'s, he declared "the bogie unit inherently attempts to push the vehicle forward in a straight line and combats to some extent the steering effort of the front wheels. It has been shown that at least 14 per cent of the gross weight must be on the front axle to obtain safe steering response under adverse conditions. We are assured of this but the shortened wheelbase of the C.O.E. six-wheeler augments the problem due to the shorter lever arm that extends between the center of the bogie unit and the front axle."

The impairment of riding qualities, he said, "has been particularly noticeable on the extra short wheelbase as in the case of the tractor unit." The C.O.E. truck, he concluded, is ideally fitted to many applications.

Maintenance of cab-over-engine trucks versus conventional trucks was tackled by Robert Cass, assistant to the chief engineer of The White Co.

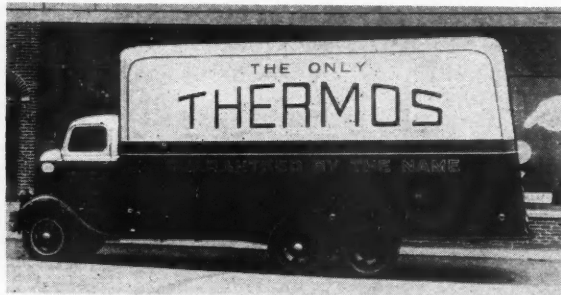
"I think there does exist," he said, "a general impression, and this impression is understandable until a thorough analysis is made, that the cab-over-engine vehicle must cost a lot more to maintain. It is very difficult to visualize how one can take an engine and practically hide it, as we have to in this type of vehicle, and still preserve a measure of accessibility that normally seems to exist in conventional trucks. I say seems to exist because in some conventional trucks extremely stylized designs have in many cases made the accessibility of these conventional trucks a matter of much argument. However, if there is a higher maintenance cost on the C.O.E. type, it is most certainly one of small degree."

Mr. Cass admitted that in his search for maintenance costs he had encountered difficulties. Comparative cost figures did not seem to be available. All of which led him to conclude that a

(TURN TO PAGE 87, PLEASE)

TRUCKTOR

FOR AUTOMATIC LOAD DISTRIBUTION



Another Difference Between Six-Wheeler and Tractor-Trailer That Vitally Affects Operations

TRUCKS not loaded beyond tire capacity—each tire sharing weight within its load rating—that's the ideal condition for economical operation.

Total load capacity is a known quantity that scales will check—but how will you insure accurate load DISTRIBUTION? Loads vary—loaders vary. Some one pays the bill for bad guesses. It is costly.

Type of vehicle is the answer. Compare a Tractor-Trailer with the best type of Six-Wheeler!

Load distribution on a trailer is solely dependent upon the loader's experience, or lack of it—his care or carelessness. On a six-wheel

truck of TRUCKTOR type load weight is distributed automatically on an exact ratio over rear axles. Its front end load involves no such critical conditions as prevail on a trailer, whose front end pivots over the driving wheels of the tractor. Trailer front end load must be heavy enough to get traction, with avoidance of light loading that would increase liability of skidding or jackknifing on curves, when brakes are applied.

These brief statements suggest the desirability of getting the facts from every angle when buying equipment. We shall be glad to send you all data on TRUCKTOR. Write for it.



THE TRUCKTOR CORPORATION • 156 WILSON AVE., NEWARK, N. J.

(CONTINUED FROM PAGE 84)

better appreciation of existing differences might be had by making an analysis of the various operations which have to be performed on either type of vehicle.

"Generalizing," he said, "I think we may say that in the average C.O.E. model it is possible to expose the engine for ordinary adjustments of distributor, changing of spark plugs, attention to water pump and the normal accessories of the engine in about the same number of motions as on a conventional job. Actually in the case of units of a rating where the tire size demands high fenders, the accessibility of the conventional engine for these details is very often not as good as the accessibility inside the cab of the C.O.E. Further, I think it may be reasonably argued on the matter of removal of the power plant, which in the conventional job involves moving of hood and radiator before the engine can be swung out, that it is certainly not much easier than where an engine is mounted on a sub-frame and slid out from the front with the radiator and transmission as part of the general engine assembly.

"With regard to the sheet metal work and the cab, certainly in present-day designs there should be no reason to expect as high maintenance on the C.O.E. job because of the compactness of the sheet metal and cab setup. Fender maintenance from the point of view of cracking or breaking under severe operating conditions, is entirely unknown in the C.O.E. The same is true of the cowl setup.

"If we take into account the factor of material and labor for repairs resulting from accidents the C.O.E., due to its improved vision from a driver's standpoint, should certainly show up in a favorable light.

"It would seem that whatever compromises have been necessary in the C.O.E. design they have not been of such a nature as to seriously increase the maintenance cost."

The discussion which ensued on the three papers developed some interesting viewpoints, practically all of them tending to confirm the belief that the C.O.E. type of truck is going to get even more attention from truck designers and that its use is certain to expand into all types of operations. The C.O.E. is definitely a new style trend and an approach to the transportation ideal, which is a vehicle occupying the smallest amount of space commensurate with the load to be carried.

B. B. Bachman, chief engineer of The Autocar Co., a pioneer in C.O.E. development, said that the estimate of 14 per cent of the gross on the front

of a six-wheeler C.O.E. was too low.

"It might work out with a loaded vehicle," he declared, "and even there it is right on the edge, but unladen it would result in difficulties on certain types of roads."

Riding quality, he contended, was a matter of design, and he said in the case of Autocar this was satisfactory even with a 96-in. wheelbase. In regard to maintenance costs he contributed the statement that a large fleet which has operated C.O.E.'s for three years and run up large mileages has found the operating cost entirely satisfactory.

Colonel G. A. Green, chief engineer

of General Motors Truck, said that availability and pricing of C.O.E.'s will greatly outweigh minor questions of design which might be brought up.

"In regard to maintenance," he declared, "in our service department we have flat rates and the same rates apply to jobs on both the conventional and C.O.E. types of vehicles—with the one exception of removal of the power-plant as a whole."

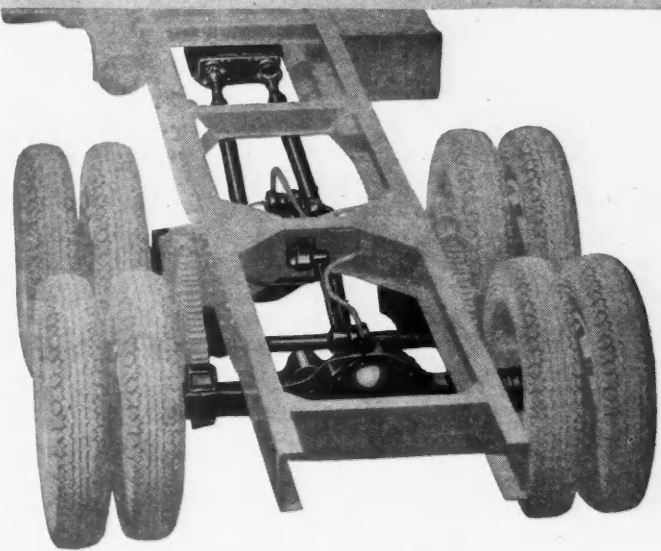
This led him to comment on what seems to have become a controversial matter . . . the need of a sub-frame for engine removal.

(TURN TO NEXT PAGE, PLEASE)

... News of Importance!

TIMKEN *Tandem Drive Unit*

bevel gear drive with inter-axle differential



- ▼ Two Timken Bevel Gear Axles.
- ▼ Torque Divider, incorporating Timken High-Traction differential, mounted on frame — *reduces unsprung weight.*
- ▼ No possible interference between forward axle and rear axle propeller shaft.
- ▼ No external lubrication.
- ▼ Complete flexibility. No transfer of weight. Greater traction.
- ▼ Two capacities—TIMKEN "SBD-1000" Series and "SBD-1500" Series.

Another proof of leadership by
SIX-WHEEL HEADQUARTERS

TIMKEN AXLES

THE TIMKEN-DETROIT AXLE CO.
Detroit, Michigan

(CONTINUED FROM PAGE 87)

"Originally," he said, "we provided a sub-frame for removal of the powerplant. But it was not long before we were asked by the sales department to eliminate the sub-frame to lower the cost and because experience had shown that engines were infrequently taken out."

Fred Faulkner, manager of Armour & Co., automotive department, said: "I find that I rarely line up with the thinking of factory sales departments but candidly in the case of C.O.E. design I think they have something to sell. Regarding accessibility, when we

went in for this type of vehicle I felt that we might have a big maintenance problem and I insisted on sub-frames for ready removal of the powerplant. However, these first purchases have been in service for three years and we have yet to pull an engine. We find little difference in maintenance costs between the present conventional types and the C.O.E.; but there is a considerable difference between the old types of conventional jobs and the C.O.E."

Clinton Bretell, superintendent of garages, R. H. Macy & Co., Inc., said: "The cost factor is important especially

in the case of the light units." He felt that on the C.O.E. jobs he has in service, the running maintenance at least will probably be less expensive than for similar conventional jobs.

Agreeing with Mr. Schon that the three outstanding factors responsible for the revival of the C.O.E. unit were legal restrictions, greater maneuverability and the advertising value of its appearance, Mr. Lautzenhiser, of IHC, went on to say "We should not lose sight of the fact, however, that the C.O.E. unit is entirely unfitted and should not be sold to the world's largest user of motor trucks—the farmer, because with one-third gross at front it is inclined to bury the front end in soft going on the farm and in other operations off the highway. The conventional unit with but 20 to 25 per cent of the gross on the front is less liable to bury and therefore is more adaptable.

Regarding maintenance costs, Mr. Lautzenhiser observed that, while he had seen no convincing figures to bear out the contention, it seemed to him that the combined lower initial, replacement and maintenance costs of tires alone would go a long way toward actually lowering the operating costs of the properly designed C.O.E. unit as compared to the conventional. He took to task those manufacturers who adhere to SAE standard CA dimensions in the case of conventional trucks but disregard them in dimensioning their C.O.E. units. If the CA standards are not satisfactory for the C.O.E., the matter should be given consideration.

Maurice Walter, chief engineer of Walter Motor Truck Co., amended the statement pertaining to unadaptability of the C.O.E. in off-the-road work by saying that four-wheel drive C.O.E.'s were being used in government services.

Mr. Schon, in summing up, seemed to size up the C.O.E.'s future logically when he said: "As the price differential shrinks the use of the cab-over-engine truck will be automatically expanded because of its many operating advantages and greater utility value."

The fundamentals of vehicle performance were explored by Merrill Horine, of the Mack company, and contrasted with some of the confused conceptions which prevail in this field.

He criticized the unscientific results obtained in many cases from the use of auxiliary transmissions, while admitting that "auxiliary transmissions have a definite place in the transport picture, both as makeshifts pending the development of transmissions truly adequate for modern demands, and as a means of meeting extraordinary re-

(TURN TO PAGE 90, PLEASE)

for



**BRAKE BLOCKS
LINING**

*Safety
Service
Stops*


"Custom-Bilt for every brake"

Save Time—Mark and replace brake shoes and parts in original position. See Gatke service suggestions.

Gatke Brake Blocks and Lining contain the correct holding power required for each brake shoe and system.

Furnished in Sets and Rolls

Gatke Extra Heavy Duty Woven Brake Lining — long fibre — special treatment — is a tough, high coefficient of friction material (Semi-moulded). Gives extra good service and results. Mostly used for external applications.

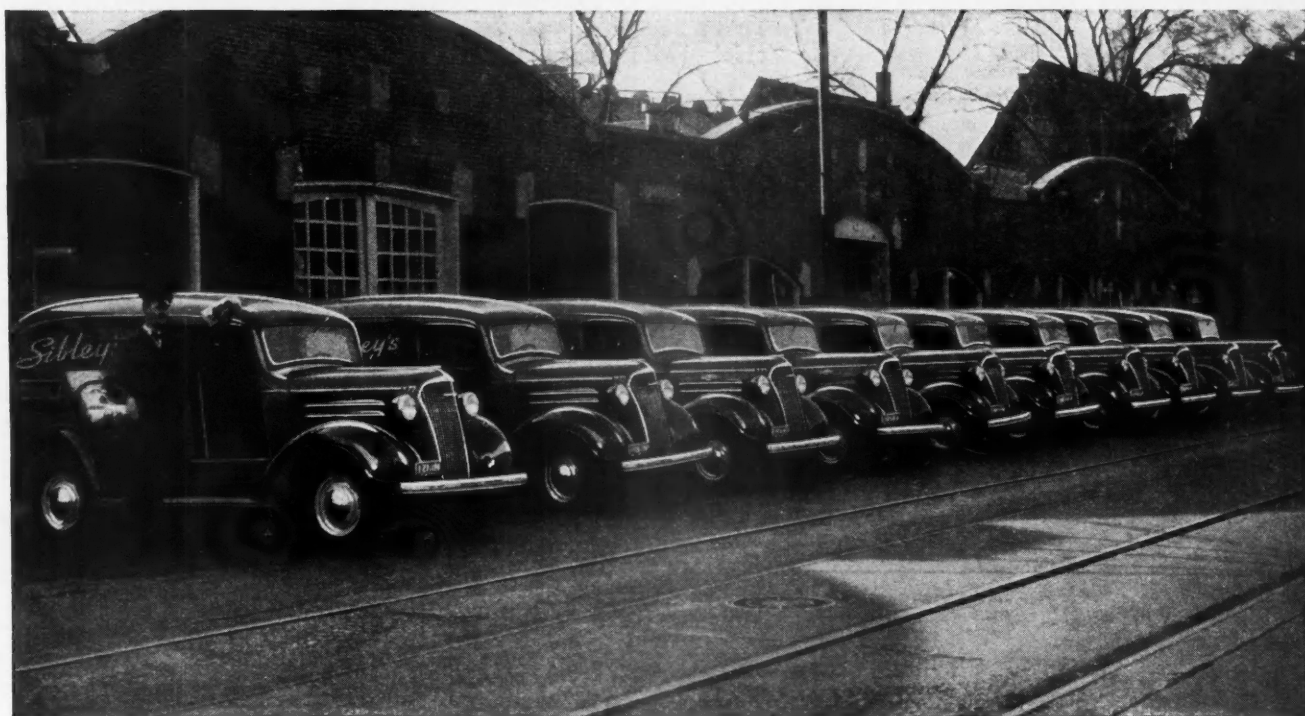
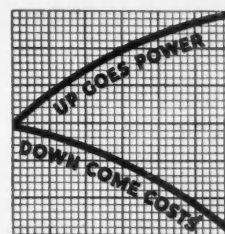
Ask Your  Jobber or Write
for material recommendations and complete
information regarding your requirements.

GATKE CORPORATION

228 N. La Salle Street

Chicago, Illinois

1937 CHEVROLET TRUCKS AND COMMERCIAL CARS



Fleet Owners Buy Chevrolet Trucks and Commercial Cars for Unequaled Economy and Reliability

Chevrolet's "Rim of the Nation" test run in an "Economy Model" Half-Ton Pickup, recently conducted under the supervision of the A.A.A. Contest Board, offers fleet owners an exact, reliable basis for comparison of truck operating costs.

Only Chevrolet's High-Compression Valve-in-Head Engine has produced such an amazing record of economy and durability. Low gasoline and oil costs and negligible upkeep expense have never been so conclusively demonstrated—and by the engine that offers the greatest pulling power in the entire low-price field!

Chevrolet trucks and commercial cars are the only low-priced trucks with Perfect Hydraulic Brakes, for maximum safety and minimum upkeep. Increased Load Space and Improved Weight Distribution allow bigger loads per trip—another important economy for fleet owners.

See these new Chevrolet units, with their New Steelstream Styling—as smart and modern as they are economical and dependable. Ask your Chevrolet dealer for a demonstration.

General Motors Installment Plan—monthly payments to suit your purse.

CHEVROLET MOTOR DIVISION, General Motors Sales Corporation, DETROIT, MICHIGAN



**Unmatched Economy
Proved in 10,244-Mile
"RIM OF THE NATION"
TEST RUN
With Half-Ton "Economy Model"
Pickup—1,000-Pound Load**



Location of Test... 'Round the Nation, Detroit to Detroit
Distance Traveled... 10,244.8 Miles
Gasoline Used... 493.8 Gallons
Oil Consumed... 7.5 Quarts
Water Used... 1 Quart
Gasoline Cost... \$101.00
Gasoline Mileage... 20.74 Miles per Gallon
Average Speed... 31.18 Miles per Hour
Running Time... 328 Hours, 31 Minutes
Gasoline Cost per Mile... \$.0098
Average Oil Mileage... 1,385.9 Miles per Qt.
Total Cost of Repair Parts... \$.73
These records have been certified by the A.A.A.
Contest Board as being officially correct.

CHEVROLET

FOR ECONOMICAL TRANSPORTATION

"MORE POWER per gallon LOWER COST per load"

(CONTINUED FROM PAGE 88)
quirements as to ratio range."

He conceded the many advantages offered by semi-trailers and six-wheel attachments but criticized their "use purely for the sake of increasing load capacity without regard to the effect upon performance." It is impossible, he said, "to increase the gross weight moved by a vehicle without at the same time reducing its performance ability, and in exact ratio."

The purpose of his exploration was to "emphasize how important it is that purchasers of motor transport equipment avoid the specification of the

means whereby the desired results are to be obtained and, instead, specify the results which must be secured, in terms of maximum speed in high, maximum grade in low, and simultaneous speed and grade at some intermediate point which might represent the ruling grade upon the route contemplated, leaving the selection of the proper units to accomplish these results to the manufacturer's engineers."

Vehicle Performance

THE discussion emphasized the need for performance ability ratings.

"This subject is timely," said Mr.

Schon, of GMT, "because performance ability will receive a great deal of attention from state legislatures during the next two years. In a number of states this year bills were introduced to regulate the performance of trucks."

Mr. Lautzenhiser, of IHC, said: "The first thing to do is to get an agreement among manufacturers on a method of computing gross weight ratings and then we'll be ready to go ahead with a performance factor. There is a desire in some quarters to compel a truck to climb a 4 per cent grade at 20 miles an hour. Applying this ability factor to a 60,000 lb. gross weight combination would require about a 1500-cu. in. engine. From this it looks as if gross weights would be controlled by the performance requirements."

Mr. Faulkner, of Armour, said: "Ask truck manufacturers for the proper gear boxes and what do you find? They don't have them. It seems to me that the auxiliary transmission is the answer until such a time as the big production manufacturers can give us suitable over-all ratios. In our operations in mountainous territory we set ourselves a grade ability of 3½ per cent at 20 m.p.h. We think it is better to put a little more money into larger engines instead of putting it all on billboards and into newspapers to get the good-will of the public."

Summing up, Mr. Horine said: "The object of my presentation is to make a plea to operators to state the results they require of a truck and leave the mathematics and the methods of achieving the results to the manufacturers' representatives."

"Mr. Lautzenhiser's calculation is interesting but obviously if we can't haul 60,000-lb. loads at speeds more considerate of passenger-car traffic with which the roads must be shared, then we will have to stop hauling 60,000 lb. Also the sooner we drop tonnage ratings, which are entirely obsolete, and adopt a more provable method of rating a truck, such as gross weight based upon, say, tire capacity, the sooner many of our problems will be solved."

Oil Temperature Control

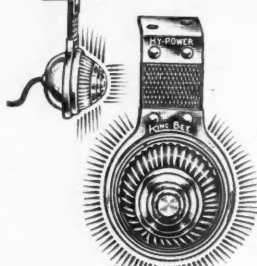
OIL temperature control, from the point of view of the fleet operator, was exhaustively treated by E. W. Templin, of the Los Angeles Department of Water & Power. Basing them on data procured under actual operating conditions in this municipal fleet of 826 trucks and 430 passenger cars, he arrived at the following conclusions:

"Complete crankcase oil temperature control would effect economies in operation by permitting lighter oils to be used safely, allowing satisfactory

(TURN TO PAGE 92, PLEASE)



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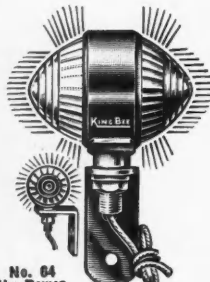
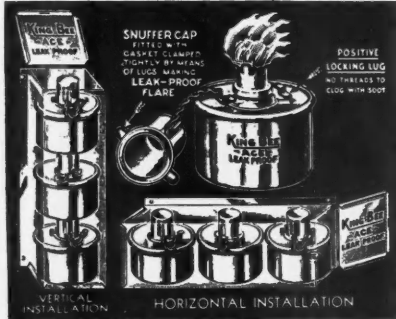


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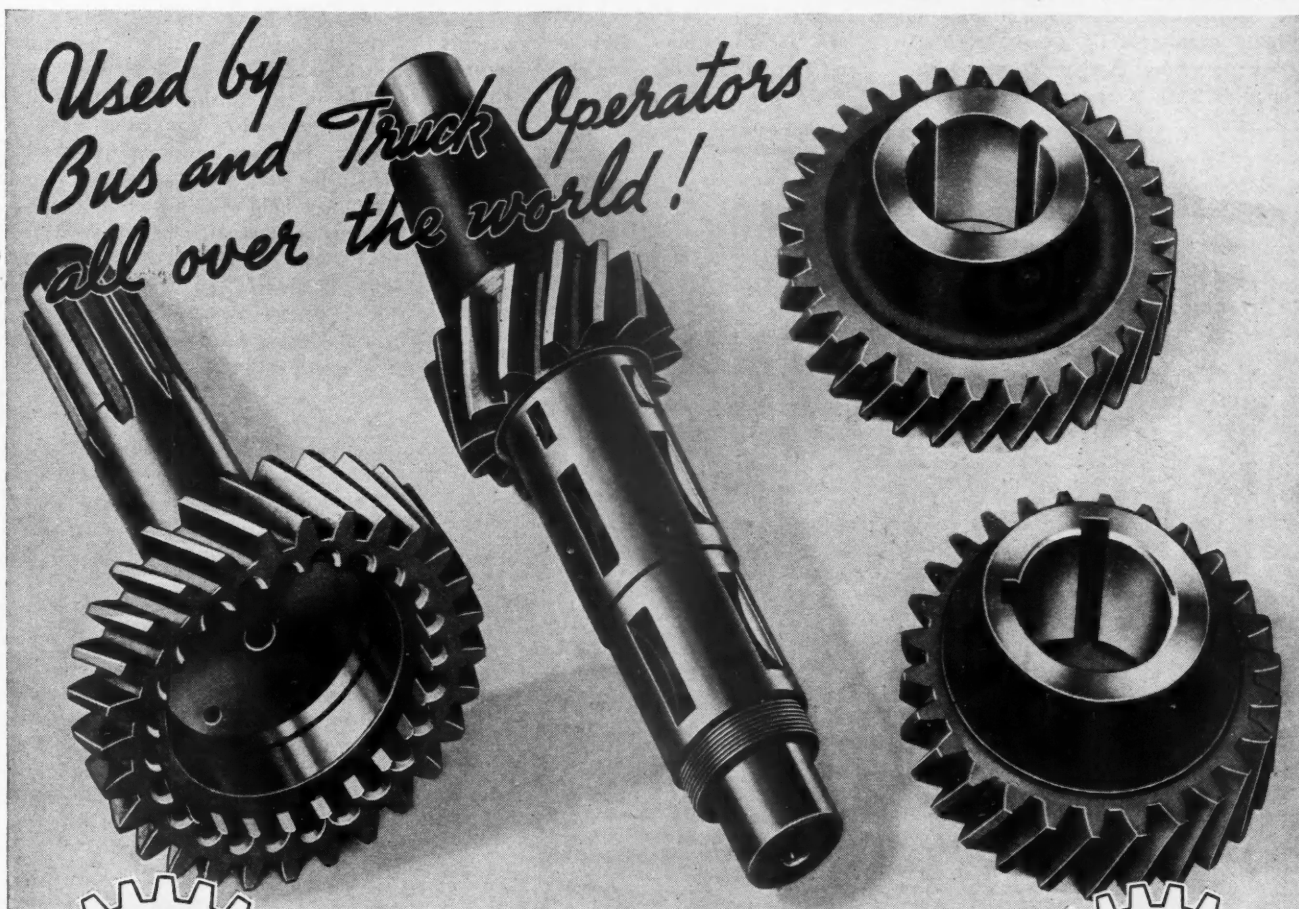
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(CONTINUED FROM PAGE 90)
starting and preventing low-temperature cylinder corrosion.

"Lower maximum temperatures would prolong the life of bearings and pistons and related parts.

"A complete mechanism for control of both high and low temperatures should be designed especially for, and built into the engine, so that the full benefit of oil temperature control possibilities may be realized.

"Until engine designers provide adequate crankcase oil temperature control, operators may well protect their engines against excessive temperature

by the use of crankcase oil temperature indicators on the dashboard with critical temperatures designated.

"In engines provided with adequate temperature control SAE 20 or 30 oil could be used almost universally year in and year out, with a reduction in engine wear and improvement in engine performance."

Diesel Engines and Fuels

RECENT trends and developments in European automotive diesel engines were dealt with by J. H. Pitchford,

associated with H. R. Ricardo in Ricardo & Co.

After discussing injection systems and stating that, apart from one or two outstanding exceptions it is accepted among European engine makers that for reliability of service the pintle type of injector nozzle is second to none, Mr. Pitchford gave a brief review of construction trends and how persistent troubles have been alleviated or overcome.

The one-piece cylinder block and crankcase as one iron casting has gained much ground, he said and predicted it would oust the fashion of using a separate light alloy crankcase and iron block. He gave two reasons for this: first, because light-alloy crankcases have been held responsible for the main bearing troubles that have been experienced, and second, because it is possible to realize the same weight with the one-piece construction. For road vehicle work, he declared, a compression ignition engine should not weigh much more than 10 lb. per brake horsepower, based on the maximum power at governed speed, this weight to include flywheel but not generator or starter motor. The one-piece construction, he said, is resulting in lead bronze bearings being replaced by white-metal bearings.

There is a marked swing, Mr. Pitchford said, toward dry cylinder liners because of the absence of distortion under operating conditions and in being free of awkward gas and water joints. For what it was worth, he gave 0.004 inch per thousand hours measured at the top ring level as being a fair average wear figure today for European C-I engines.

Aluminum-alloy pistons have been remarkably trouble-free, he said, and piston-ring sticking has not been as serious a problem in Europe as it appears to have been in this country. In the author's experience the placing of rings with tapering section in the two upper grooves has proved a complete cure where properly applied.

In the matter of diesel maintenance, Mr. Pitchford admitted difficulty in obtaining accurate figures since, he contended, "such figures are apt to be colored by the enthusiasm or otherwise of the operator." But the London Transport Board, operating nearly 2000 Comet Diesels and about 3000 gasoline buses recently publicly stated that the maintenance costs of the two are now about exactly the same, while the mileage per gallon the Diesels is a full 100 per cent greater, despite a very rigid routine tuning of the gasoline engines.

Mr. Pitchford concluded by referring to the success of a 4-cylinder diesel of

(TURN TO PAGE 94, PLEASE)



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The door is held snug and tight and the load is protected against petty thieves. The operation of the Eberhard SLAMTITE Panel Body Lock is just as quick and easy as that. When you slam the door it is automatically pulled in tight and locked and can be opened only with a key. To open the door the driver simply inserts the key, gives it a quarter turn, puts the key back in his pocket, and opens the door with the handle. When he leaves the truck, he just slams the door, with his elbow if his hands are full, and it's locked. He can't forget. Notice the sturdy construction which insures long life and eliminates wear and rattle. Also furnished without key lock when one man is always on the truck or when it is not necessary to keep door always locked.

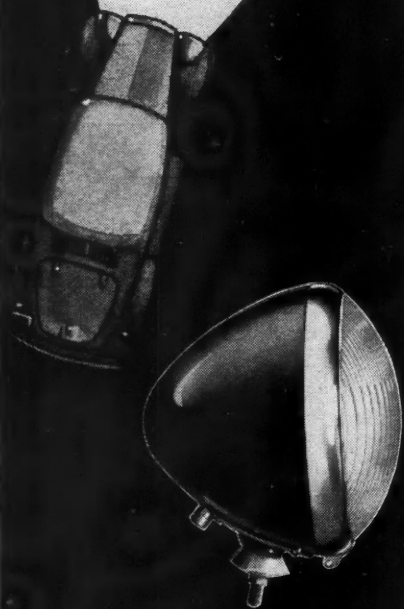
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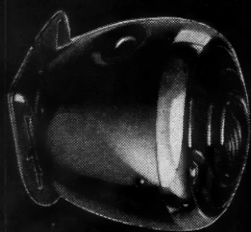
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Guide

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General Motors Corporation
Anderson, Indiana



(CONTINUED FROM PAGE 92)

107 cu. in. capacity which develops 45 hp. at 3800 and is used extensively in French delivery vans, salesmen's cars and taxicabs. These jobs are giving $3\frac{1}{4}$ times the mileage of comparable gasoline units. Their top speed is around 58 m.p.h.

In the discussion he observed that a well-designed diesel should operate on 40-45 cetane fuel. If the diesel is to gain in popularity, he said, it must operate on fuel of average qualities.

Diesel fuels and methods of determining their ignition qualities were discussed at another session. The volun-

teer group for compression-ignition fuel research recommended that diesel fuel be rated for ignition quality on the basis of its cetane number.

Hypoid Lubrication

IN the course of his presentation on hypoids, W. A. Witham, of Gleason Works, foremost in hypoid gear manufacture, observed that "the problem of the lubricant manufacturer in providing a lubricant of sufficient E.P. value has been simplified to a considerable extent by recent developments. Greater accuracy in producing gears, improved surface finish, the design of more rigid

carriers and superior control of the tooth bearing shape all serve to increase the carrying capacity of the gears and tend to decrease the necessary E.P. value of the lubricant."

R. M. Riblet, assistant chief engineer of Timken Roller Bearing, declared in discussion that ring gear diameters can be reduced in hypoid gears, and wondered when the time would come when smaller differentials would be used behind larger engines. Manufacturers now, he said, are still using the larger spiral gears. He said he knew that the smaller gears were now being seriously considered.

Mr. Witham replied that due to sliding action and failure of lubricant smaller ring gears have not worked out.

"We have now a couple of experimental truck jobs," he revealed, "using a 11-in. gear diameter. The time is coming when hypoid gears will be used in extreme ratios."

C. M. Larson, supervising engineer of Sinclair Refining Co., argued the need for simplifying recommendations of transmission and rear axle lubricants. Touching on the practical aspects of E.P. lubrication he said flushing difficulties are presented in the field when E.P. lubricants congeal. It has been found satisfactory, he explained, to use kerosene with a cold flusher. The congealed mass must be reduced to a fluid viscosity otherwise 10 to 15 per cent of the old gear lubricant will stick to the case.

Various discussers, including car factory men, expressed hope for a simplification in lubricant specifications. It was admitted that too many types are now recommended and that many mistakes are likely to be made in the field. Need was expressed for an SAE numbering system for E.P. lubricants without regard to composition. As it is now E.P. lubricants are specified by brand name.

Mr. Brettell, of R. H. Macy, spoke for fleet operators when he, too, urged simplification of lubricant recommendations in order to insure more efficient servicing.

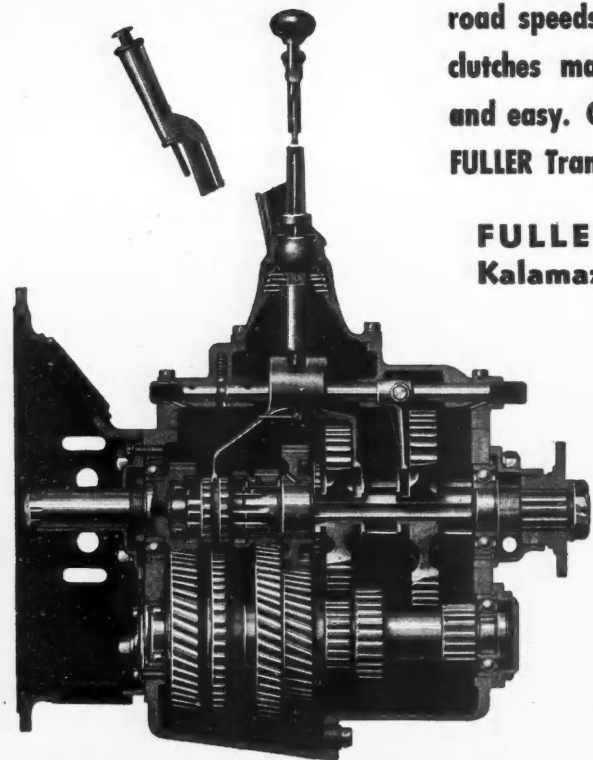
Major Parts

(CONTINUED FROM PAGE 23)

with our scheme, over the internal or "long" inspection periods, than with any other items, I will recount the reasons for them.

MASS transportation, such as we encounter, with its frequent stops, reduces our average speed on many lines as low as seven m.p.h., but increases our accelerating periods proportion- (TURN TO PAGE 96, PLEASE)

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FULLER Five Speed Transmissions will help you haul maximum pay load per dollar. The carefully engineered ratios of the five forward speeds and two reverses enable you to make fast time with heavy loads, over all roads. Wide helical gears give you three quiet road speeds. Staggered tooth clutches make shifting quiet and easy. Choose trucks with **FULLER Transmissions. It pays!**

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(CONTINUED FROM PAGE 94)

ately, and that, combined with the extremely hilly nature of the territory over which we operate, obliges us to maintain extremely high engine revolutions and extended periods of low and intermediate gear work. This results in abnormally high wear factors in cylinder bores, rings, wrist pins and bushings, and main and connecting rod bearings.

Excessive wear in all engine parts have led us into some very interesting research work regarding these items, particularly that of cylinder wear. Our studies of cylinder wear were so closely

related to preventive maintenance, that it resulted in very definitely prolonging our engine life. The selection of iron alloys, during the past few years, with increasingly superior wear characteristics, has provided us, with improved dry sleeves, that in one aggravated case, represented five times greater engine life.

Our method of recording cylinder bore dimensions at every 20,000 to 30,000-mile interval, is relatively simple, but the results obtained have repaid us enormously. On a sheet containing only enough information to identify the cylinder block or blocks

being measured, are 12 circles representing the top and bottom of ring travel in each bore, and in these circles, are recorded their accurate dimensions. These sheets are filed and when occasion arises, charts are prepared for study.

From our studies we have found that modern bus cooling systems designed for sustained engine speeds, are of such dimensions and efficiency that slow speed operations, such as ours, could not hope to maintain sufficiently high water temperatures to successfully combat excessive condensation, without resorting to mechanical means. Water jacket temperatures of 160 deg. F. or less, without adequate crankcase ventilation and modern heat control devices, invites emulsification of all types of oil. We were able, with the help of thermostatically controlled shutter fronts and cotton bag filters, to reduce emulsification to a minimum.

ENGINE valves have required much of our thought in the past, but in recent years have caused us exceedingly little trouble. We feel this is due to having arrived at the very definite conclusion that most valve trouble originates at the valve face. All valves eventually become hard faced, with Stellite, on our property. We are particularly careful in fitting valves, using the most modern methods for valve seat and face preparation. We prefer the old cast iron seat to the hard-faced seat, although we have many of the latter in operation. In fact, we run hard-faced valves on hard-faced seats, in many of our engines.

We prefer cast iron seats, because we can keep them narrow, never exceeding 1/16 to 3/32 in. With hard-faced valves dimensioned to stand high on these narrow seats, we are assured of unobstructed valve openings and cool valves.

We have experimented very successfully with Stellite wrist pin bushings and nitrided chrome vanadium wrist pins, and although they gave us exceptional wear, we have not adopted these very long-lived materials, because of the additional expenditure necessary for the special materials and the fact that our scheme called for opening up engines at comparatively short intervals.

Piston rings, a very important item, are changed every "long" inspection, for we feel that ring wear is very definitely tied up with oil economy. We also prefer to operate some engines up to the 25,000ths of an in. wear mark, before reboring, and this requires more frequent ring changes.

Having encountered many failures in
(TURN TO PAGE 98, PLEASE)



FOR ACCURATE TIRE PRESSURES

Fleet service schedules require that tires be checked regularly, some as often as three times a day. For this type of work, service men need a tire gauge that can be used almost continually with unvarying accuracy.

Schrader Tire Gauges are known for their outstanding dependability. Their minute accuracy is maintained, even in severe service, by the famous "direct-action" principle.

To be sure of maintaining correct tire pressures, even in a road emergency, equip each of your vehicles with a Schrader Gauge. Regularly used, it will pay for itself many times over.

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THE NEW AC BLUE TOP



- LONGER PLUG LIFE
- GREATER RELIABILITY
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All of the pioneering improvements which earned for AC Regular and Long Life plugs an outstanding reputation for quality and reliability are consolidated in the new AC Blue Top line. *And, in addition, Blue Tops for heavy service incorporate many important new features—expressly developed for bus, truck, and tractor duty.*

Each Blue Top plug is designed to the AC heat range. Each type, furthermore, has a wider heat range itself.

In the new AC Blue Top Spark Plug, consequently, you get longer life, better fuel economy, greater reliability, and full satisfaction.

Install the new AC Blue Top yourself. From AC's Conversion Chart, you can quickly select the correct type. Then you will see why Blue Tops are approved for original equipment—and why they are the *better* investment for your special needs.



KEEP PLUGS IN TOP CONDITION with the AC SPARK PLUG CLEANER

Designed and built by AC, this machine cleans plugs thoroughly in 5 to 10 seconds. A precision-built shop tool, it pays for itself in a short time.

REFER TO THE AC HEAT RANGE CHART, 1937 Edition, To Remedy Sooting or Pre-Ignition

It quickly shows the hotter plug type which will eliminate chronic fouling; and the cooler type that will correct pre-ignition, blow-by, and rapid electrode wear. This Chart is free.

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JUNE, 1937

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(CONTINUED FROM PAGE 96)
bus engines, we have formed certain design preferences, as follows:

We much prefer timing gears to timing chains, because of their inherently long life, and while they are perhaps more noisy at idling periods, when wear takes place, we find the extended life lends itself admirably to all our inspection periods.

For the same reason, we prefer double fan belts to single fan belts, but better still, fans, gear driven; water pumps close coupled to the gear train with full length bearings; generators of low cut in rate and ample capacity;

distributor drives of the magneto replacement unit type and gear reduction starters.

We favor specially prepared connecting rod bearings and main bearing caps, which are poured and not spun, with the tinning carefully spread in V threads to give added **adhesion**.

OUR method of prolonging crank shaft life, by spraying high carbon steel on the bearing areas, thereby continuously retaining standard bearing dimensions, is interesting.

The procedure in this scheme, is simple and the results effective, pro-

viding the shaft is prepared correctly. We first grind the worn shaft to dimensions that will give us a sprayed bushing of sufficient thickness to withstand the pressures involved, usually not less than 60,000ths, finished.

The ground area is then "shot blasted" and as many gashes or nicks cut, as are necessary to securely anchor the high carbon steel bushing to the shaft. The steel is sprayed on the shaft in a ductile state and flows evenly and smoothly into the prepared keyways. Practically all of our older shafts have sprayed bearings, some of them in operation well over 100,000 miles.

Many of our water pump housings, that are badly corroded, are sprayed with a coating of zinc.

Transmissions, while far less complicated than engines, are the weak link in many of our bus designs.

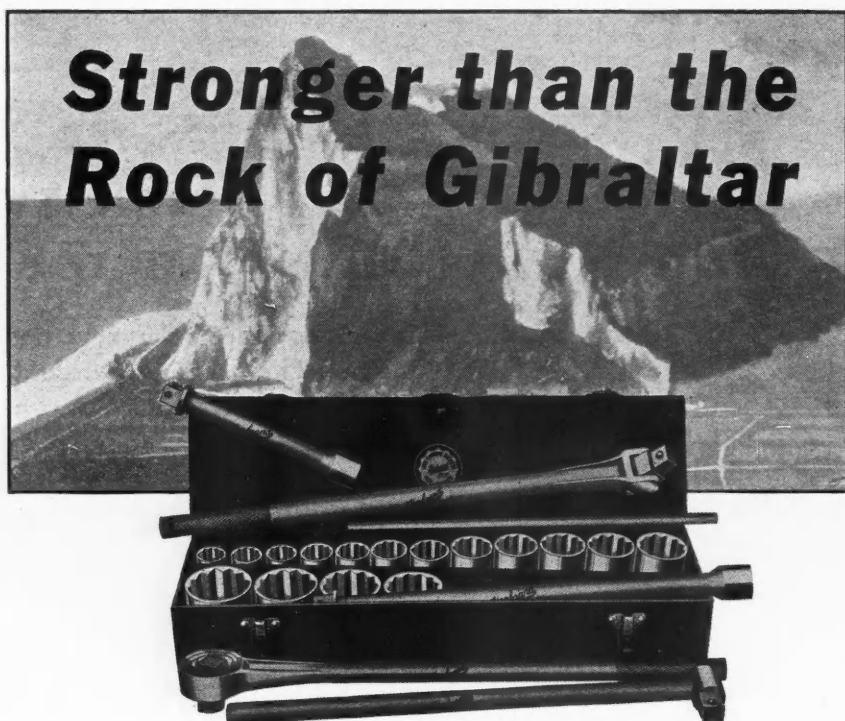
Rigid inspection and the careful selection of lubricants partially solves this problem, but it is so critical in some cases, that we have been forced to experiment with carefully selected steels and heat treatments.

We would suggest that one of our rules regarding transmission inspection, is an important one often overlooked. It contemplates readjustment of the main shaft and countershaft bearings, shortly after the units are first put into operation. It assures us that bearings cups or races, that may not have been thoroughly seated in the assembly line, are "home," and the play in the shafts has been removed.

Because of the conditions stated, we have found it practically impossible, on certain types of equipment, to anticipate transmission failure, in spite of the fact, we are certain at specified intervals, that gear tooth fracture or fatigue has not occurred.

Our front and rear axle inspections occur regularly at the 2500 to 3000-mile period. Lubrication, of course, takes place at the regular 1000-mile period. Special differential lubricants, we have avoided, particularly because it is practically impossible in a large fleet to assign special lubricants to special types of buses, without encountering endless mistakes and confusion. The front axle which is so important from a safety angle, has required more of our time and thought than any other unit of the vehicle.

As a preventive measure against failure in highly stressed units, such as drag links, Pittman arms, steering knuckles, in fact, any parts of a ferrous nature, we use the Magna-Flux method of crack detection. These checks occur at our 2500 to 3000-mile inspections, and our "long" inspections, and have been in use since 1932.



Set No. HA-82 1/2

"Van-Chrome" Heavy Duty Socket Sets are made to stand the gaff

Every shop servicing fleets should have a complete set of "Van-Chrome" Heavy Duty Sockets.

These sockets and handle attachments are *hot forged*, are light weight, are structurally superior and *cannot be broken*. Herbrand's hot forging eliminates all unnecessary bulk, and the extra thin straight side walls banish clearance problems.

Furthermore, these 12-point sockets *cannot slip* from the handle end because they are equipped with a lock-on feature.

Set No. HA-82 1/2 (illustrated) contains a total of 22 pieces. The sockets included in this set have a range of openings from 7/8"-2" inclusive. This set is described in detail in Catalog No. 50-M.



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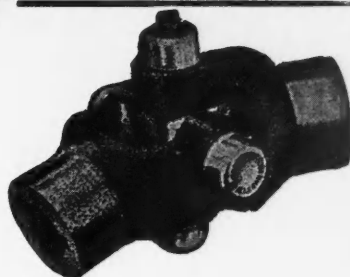
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That is why the HUG COMPANY, manufacturers of heavy duty motor trucks, road-building and construction equipment, specify BLOOD BROTHERS UNIVERSAL JOINTS. The HUG Model 97-L Roadbuilder is illustrated above.

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● In summer when motors run hotter, spark plug wires have an even tougher job than usual. Ordinary ignition cables soon deteriorate and fail to deliver the fat, hot spark the motor has to have to give its full quota of power most economically. But Sterling Silver-Sheathed Ignition Cable is engineered to withstand heat 16 times longer than ordinary cables—to deliver that fat, hot spark faithfully over many more miles of trouble-free service. The Silver-Sheath (U.S. Pat. No. 1,987,508) not only defies heat, but also resists hot oil, grease, moisture and corona, and is remarkably flame-resistant. Get your trucks ready for many months of smooth, fuel-saving operation with Silver-Sheathed. Ask your jobber or write us direct.

Replace battery cables with STERLING-NOKRODE, the full-gauge cable with the patented terminal that won't corrode! With Sterling-Nokrode the job is done for keeps!

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Washington Letter

By L. W. MOFFETT

Washington Editor

South Gangs Up On Trucks

GOVERNORS of southeastern states apparently have it in for motor trucks. Eight of them representing Alabama, Georgia, Florida, North Carolina, South Carolina, Kentucky, Tennessee and Mississippi met in Washington recently to deal with plans for getting a reduction of rail rates in southern territory. They claim that southern rail rates are about 25 per cent higher than rates in northern territory.

At this meeting Governor Graves of Alabama, head of the governor group, raised the subject of truck competition and said that unless something was done to bring down rail rates, the truckers would get much of the business which the rail carriers now have. He said that already motor carriers have a monopoly on carrying tobacco harvested in North and South Carolina. He claimed that Alabama now has the truckers "licked" and contended that the railroads and not the trucks are the real friends of the South.

The Railroads and Public Utilities Commission of Tennessee joined the attack against trucks by proposing a tariff which would reduce truck rates from 18 to 46 per cent.

Southern truckers, assisted by the American Trucking Associations, are preparing to defend themselves.

ICC Ruling On Contract Carriers

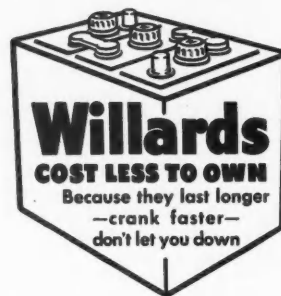
EFFECTIVE July 1, 1937, motor vehicle contract carriers must have written contracts or agreements with shippers—or else. They will be as binding on the shipper as on the trucker. This far-reaching interpretation of the Motor Carrier Act was handed down by Division 5 of the Interstate Commerce Commission late in April, with Com-

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missioners Eastman and Caskie agreeing and Commissioner Lee sharply dissenting. The order states that the contracts shall provide for transportation for a particular shipper or shippers, he bilateral and cover a series of shipments during a stated period . . . in contrast to contracts . . . governing individual shipments. Copies of the contracts—which need not be filed with the I.C.C.—are to be preserved by the carriers so long as they are in force and for at least one year thereafter.

Under the order, the Commission will require a condition that all applicant contracts shall conform to the requirements, to be attached to each permit issued. Also all contracts thereafter substituted or added, within the scope of the permit, shall conform to the requirements, and be attached to the permit. An analysis of the ruling and its effect on contract carriers appears on page 35.

Pettengill Bill

HURDLING the House by the preponderant vote of 268 to 120, the Pettengill long-and-short haul clause bill now lies before the Senate Committee on Interstate Commerce, whose chairman, Senator Wheeler of Montana, unfriendly to the measure, has not indicated whether he will call further hearings on it. Meanwhile, the Chamber of Commerce of the United States has revived differences between trucking and railroad interests over the legislation by putting it to a referendum vote of member organizations. The Chamber Committee on Transport-

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tation, which has no trucking representative, takes the railroad stand by recommending elimination of the clause, as does the Pettengill bill. However, there is doubt that the bill will get past the Senate Committee. This view is based primarily on the opposition of Senator Wheeler and other committee members, together with the heavy legislative jam that has been built up by the Presidential recommendations for enactment of highly controversial and far-reaching measures. The long-and-short haul bill in all probability could not be wedged in. So, without attempting arbitrary prophecy, the best bet appears to be that the bill will see a tired Congress adjourn late in the summer without its being passed.

**Superchargers—
A Blow for More Power**

(CONTINUED FROM PAGE 27)

power to drive your shop compressor and the supercharger is a compressor, after all, and it takes power from the engine's output to drive the supercharger. The art in supercharging an engine successfully, then, becomes one of designing a supercharger which has a very favorable ratio of power increase to power consumed so that there will be a large net increase of power which is available for pulling loads. A good supercharger will consume in its own drive somewhere in the neighborhood of one-half of the total power increase made possible by its use. Curiously enough the best results are being obtained on big engines with big superchargers.

SUPERCHARGERS may be divided roughly into two types. There is the centrifugal type which looks like a modified water pump and the positive displacement type which consists of two mating impellers revolving within a single case. The centrifugal type of supercharger has to turn between 18,000 and 25,000 r.p.m. to be effective and it is desirable to have the drive shaft turning much slower than that. The increase in speed between the shaft and the business end of the supercharger can be accomplished by either a pair of gears giving the proper reduction and one interesting method that is being used now is a planetary friction drive. The ratio of the impeller to the shaft with this drive is sometimes as high as 7 to 1. The positive displacement type of supercharger turns somewhat slower than the centrifugal type.

(TURN TO NEXT PAGE, PLEASE)

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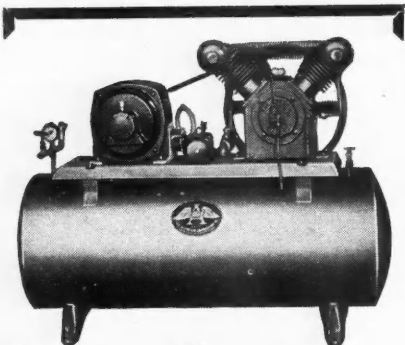
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Cornell Catalog

CORNELL IRON WORKS, INC., 36-20 13th St., Long Island City, N. Y., has a new 12-page catalog illustrating its new upward-acting doors in a variety of installations. Write for a free copy.

(CONTINUED FROM PAGE 123)

The speeds at which these devices operate have not caused as much of a design or material problem as you might think. At such speeds most of us are inclined to think of highly intricate balancing and highly special materials. The balancing is just simply good balancing practice and there are any number of machine parts that are balanced as well as the parts of a supercharger.

For materials, the manufacturers use high carbon or nickel steel shafts, aluminum housings and other castings are of grey iron. Anti-friction bearings used in superchargers are exactly the same bearings as the jobber would take off his shelf if you asked for a bearing for replacement in some other location in the vehicle.

Noise created by the supercharger was objectionable for a number of years and until this was brought under control it provided a first class handicap to supercharger development on automotive vehicles. The noise problem has been adequately met, not by the supercharger manufacturers but by the air cleaner and silencer manufacturers. Instruments for analyzing sound were developed not especially for quieting superchargers but for quieting all gasoline engines and those equipped with superchargers have not differed radically from the engines not so equipped.

THERE are two possible places to mount a supercharger. One is on the intake side of the carburetor and the other is between the carburetor and the intake manifold. The carburetor to manifold location seems to be getting the nod for several reasons, chief of which is the fact that carburetors will have to be re-designed into much more expensive instruments if the push type supercharger is used instead of the pull type. Mounting a supercharger on the outside of a carburetor will mean that the carburetor body will have to be strong enough to support a device that weighs more than the carburetor does without distortion and in addition the

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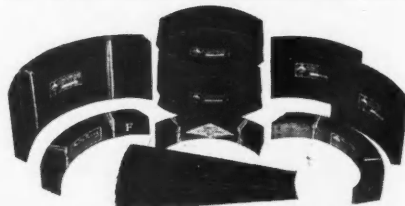
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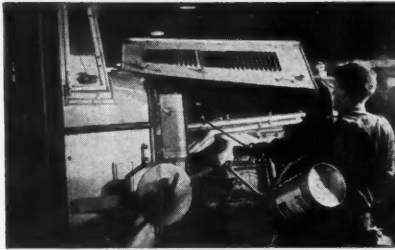
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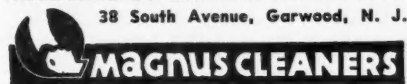
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device has to be connected with an external drive that will do the carburetor no good at all. If that is not enough reason there is still the fact that the carburetor valves, seats, needles, etc., will not effectively seal under the increased pressure of the supercharger.

Since we have said that the supercharger was a compressor and have mentioned the increased pressure involved with supercharger installation it might be interesting to discuss the actual pressures. Most engineers agree that a supercharger is completely useless unless it creates an intake manifold pressure of $3\frac{1}{2}$ lb. per sq. in. Most of them want more than that and the average workable range in automotive work seems to be $4\frac{1}{2}$ lb to $5\frac{1}{2}$ lb. There is some talk of manifold pressure up to 10 lb. but there is no evidence that anyone has been able to get that much.

Scanning some laboratory results which were merely workaday records from the dynamometer and not something prepared for a visitor who might tell all, we find that one engine with a horsepower peak of 105 was stepped up to 125 h.p. Another went from 68 to 92 h.p. at the peak while the best result showed a 90 h.p. engine turned out 125 h.p. when equipped with a supercharger. The horsepower peak occurs at a higher engine speed when a supercharger is used and consequently it is necessary to have an engine that will stand a higher r.p.m. than normal unequipped to take advantage of supercharging. In a properly supercharged engine, provided that the compression ratio and cooling is what it should be it is possible to increase the power between 30 and 40 per cent. Supercharging is especially desirable on trucks working in high altitudes where the rarified air interferes with the sea level efficiency of the engine.

SUPERCHARGERS may be gear, chain or belt driven but the belt drive seems to be the most popular right now. Supercharger manufacturers tell us that right now one of the biggest mechanical problems that they run up against is finding a place to put the supercharger on modern compact engines. Another problem, not mechanical, that they have is to get over the idea that supercharger speeds are harmless and that there will not be any particular maintenance problems as a result of the application of this fast turning device.

Superchargers can be made in combination with the water pump or the oil pump and at least one is being made now incorporating its own oil (TURN TO PAGE 126, PLEASE)

THE ROBINSON UNIVERSAL COUPLING HOLDER

- HOLDS SECURELY
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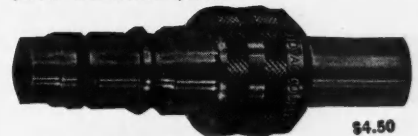
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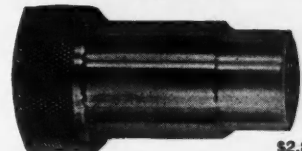


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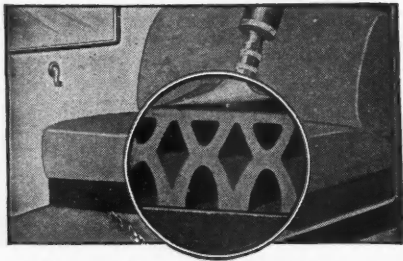
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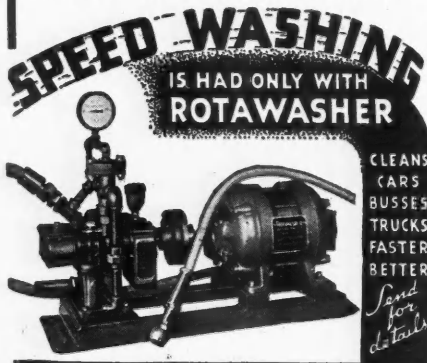
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(CONTINUED FROM PAGE 125)

pump which serves to lubricate only the supercharger.

The general idea of supercharging is quite old. More than twenty-five years ago engine builders were experimenting with it but the experimenting got turned aside because there were so many other developments that had to come first. New materials that have appeared in engines have made the idea of supercharging much more practical than it was years ago and it would not be surprising to see the device become standard equipment on many cargo vehicles.

After Hours

(CONTINUED FROM PAGE 34)

cent grade at 20 m.p.h. Some highway officials, who are friends of the trucking industry, but who have a sincere desire to promote safer traffic conditions on existing highways, favor the 4 per cent factor. On the other hand, regulatory officials, who have a sincere interest in safety, fear that the imposition of a 4 per cent factor would have a harmful effect on the trucking industry.

A compromise of these two viewpoints seems logical. It is contended by truck transportation engineers that a great many of the trucks operating in hilly country today would not be able to meet even a 2 per cent factor. Therefore, it is obvious that to impose any factor on existing vehicles would be to cause a serious economic disturbance. Affected operators would be compelled either to carry smaller loads or replace the equipment at once. In the for-hire field the effect on rates would be considerable. Under the circumstances a "grandfather clause" in the effective date of whatever ability factor is ultimately adopted seems called for. In other words, the ability factor adopted—and there is still some question whether the ideal is 4 per cent at 20 m.p.h.—might be made immediately applicable to all new equipment purchased, and applicable to all equipment, say, five years hence.

This does not necessarily mean that five years would elapse before any appreciable solution of the problem would be effected. The worst offenders in the matter of underpowering and overloading do not endow their abused vehicles with long life, and the tendency is to dispose of them the moment the effects of the abuse become intolerable. It is not uncommon for such ve-

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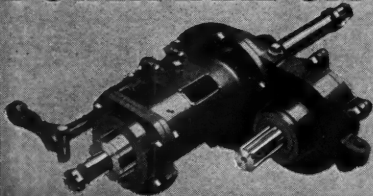
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hicles to be replaced on a yearly basis.

How soon this vital problem will be solved is questionable. However, fleet operators would do well to bear it in mind and to cooperate voluntarily in remedying a deplorable condition that has done more to breed public ill-will toward motor trucks than any other single thing.

(Comments of readers for publication are earnestly solicited.)

NEWS

(CONTINUED FROM PAGE 44)

BULLETINS

ACHESON COLLOIDS CORP., Port Huron, Mich., has published another bulletin. This one is No. 270.1 and it deals with the Utility of Graphite Surfaces. The company will send this bulletin free to any interested party who writes for it.

A DIGEST of the new Interstate Commerce Commission Safety Regulations, governing qualifications of employees and operation and equipment of trucks and buses, has been prepared in simplified form for free distribution by the Engineering Division of the Maryland Casualty Co., Baltimore. The book is offered free.

"THE WELDING OF ENDURO STAINLESS STEEL" is a new 20-page booklet just published by Republic Steel Corp., Cleveland.

APPOINTMENTS

MEAD-MORRISON division of Gar Wood Industries, Inc., Detroit, has appointed H. C. Hatch as sales engineer of the company.

LEGISLATION

GOVERNOR O. D. JOHNSTON of South Carolina has vetoed a new motor truck size and weight law designed to replace the state's 20,000 lb. maximum weight law declared unconstitutional recently. Truckers propose pressing the fight further.

A BILL designed to amend the motor carrier act to bring freight forwarders under its jurisdiction was introduced into the House of Representatives recently. The amendment applies to the operations of freight forwarders and those who undertake to transport property for the general public for-hire by utilizing the services of another carrier, termed "indirect carrier operation." It provides that all persons engaged in indirect carrier operations be deemed motor carriers and subject to all regulations applicable to common carriers.

CORRECTION

AN OMISSION in the Tire Regrooving article which ran in the March, 1937, issue of **COMMERCIAL CAR JOURNAL** appears where the authors failed to include the list of states having laws forbidding the use of bald-headed tires. Some of those states that should have been listed are New Jersey, New York, Minnesota, Ohio and North and South Carolina.

TRUCK OPERATORS! SHIPPER!

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FREE 24-PAGE BOOKLET of facts and information about truck shipping and the trucking industry, entitled "WHY SHIP BY TRUCK?"

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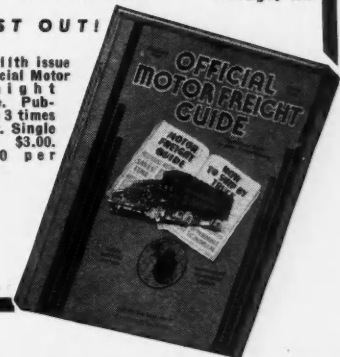
"The national guide of the motor freight industry."

734 W. Van Buren St.

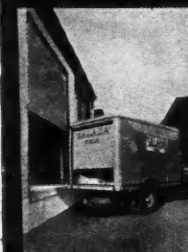
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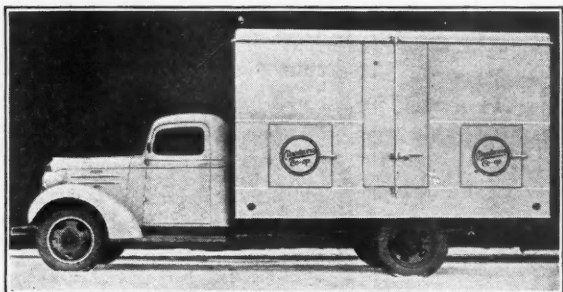
ALMA MOTOR COMPANY

384 Penobscot Bldg.
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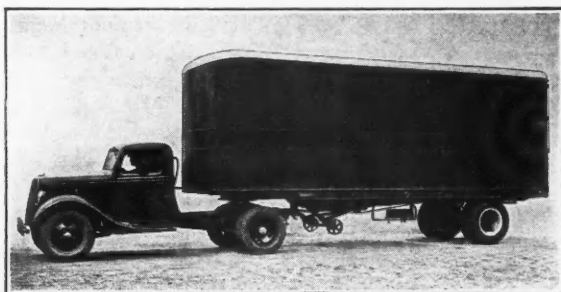
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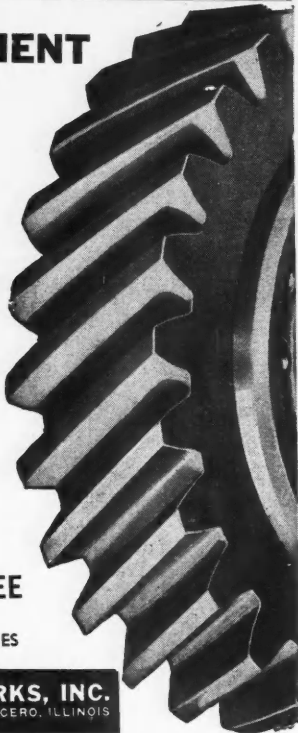
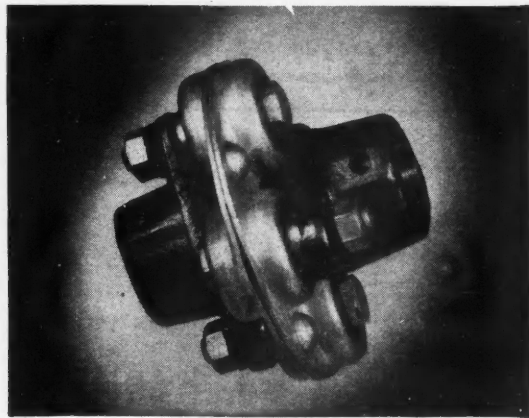
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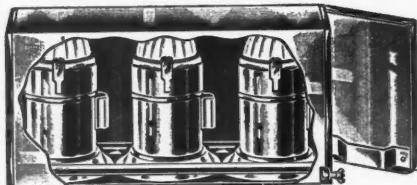
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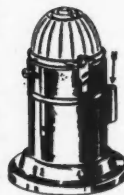
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